

## TRANSMITTAL LETTER TO THE UNITED STATES

DESIGNATED/ELECTED OFFICE (DO/EO/US)

CERNING A FILING UNDER 35 U.S.C. 371

Attorney's Docket Number

05725.0489

U.S. Application No.

09/424116

International Application. No.

International Filing Date

Priority Date Claimed

FR99/00542

March 11, 1999

March 20, 1998

## Title of Invention:

STABILIZATION DYEING COMPOSITION FOR KERATINOUS FIBRES CONTAINING A 5-MINOPYRIDINE AZO  
DERIVATIVE AND DYEING METHOD USING SAID COMPOSITION

## Applicant(s) For DO/EO/US:

Guarid LANG, Jean COTTERET and Mireille MAUBRU

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

## Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
  - ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information:
  - a. ☐ Verified Small Entity Statement.
  - b. ☐ Copy of Notification of Missing Requirements.
  - c. ☒ New Abstract.

APPLICATION NO.

INTERNATIONAL APPLICATION NO.

ATTORNEY DOCKET NUMBER

09/424116

PCT/FR99/00542

05725.0489

The following fees are submitted:

CALCULATIONS

Basic National Fee (37 CFR 1.492(a)(1)-(5)):

Search Report has been prepared by the EPO or JPO.....\$840.00  
 International preliminary examination fee paid to  
 USPTO (37 CFR 1.482).....\$670.00  
 No international preliminary examination fee paid to  
 USPTO (37 CFR 1.482) but international search fee  
 paid to USPTO (37 CFR 1.445(a)(2)).....\$760.00  
 Neither international preliminary examination fee  
 (37 CFR 1.482) nor international search fee  
 (37 CFR 1.445(a)(2)) paid to USPTO.....\$970.00  
 International preliminary examination fee paid to USPTO  
 (37 CFR 1.482) and all claims satisfied provisions  
 of PCT Article 33(1)-(4).....\$ 96.00

ENTER APPROPRIATE BASIC FEE AMOUNT = \$ 840.00

Surcharge of \$130.00 for furnishing the oath or declaration later than  
 [ ] 20 [ ] 30 months from the earliest claimed priority date  
 (37 CFR 1.492(e)).

Claims	Number Filed	Number Extra	Rate	
Total Claims	35 -20=	15	X \$18.00	\$ 270.00
Independent Claims	3 - 3=		X \$78.00	\$
Multiple dependent claim(s) (if applicable)			+\$260.00	\$

TOTAL OF ABOVE CALCULATIONS = \$1,110.00

Reduction by 1/2 for filing by small entity, if applicable. Verified  
 Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28)

SUBTOTAL = \$1,110.00

Processing fee of \$130.00 for furnishing the English translation later  
 than [ ] 20 [ ] 30 months from the earliest claimed priority date  
 (37 CFR 1.492(f)).

TOTAL NATIONAL FEE = \$1,110.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The  
 assignment must be accompanied by an appropriate cover sheet  
 (37 CFR 3.28, 3.31).

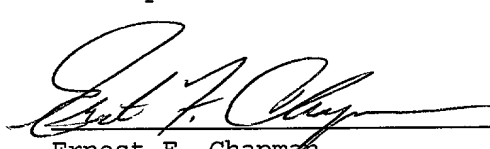
\$40.00 per property + \$  
 TOTAL FEES ENCLOSED = \$1,110.00

Amount to be  
 refunded \$  
 charged \$

- a. [X] A check in the amount of \$1,110.00 to cover the above fees is enclosed.  
 b. [ ] Please charge my Deposit Account No. \_\_\_\_\_ in the amount of  
 \$ \_\_\_\_\_ to cover the above fees. A duplicate copy of this sheet is  
 enclosed.  
 c. [X] The Commissioner is hereby authorized to charge any additional fees  
 which may be required, or credit any overpayment to Deposit Account  
 No. 06-0916. A duplicate copy of this sheet is enclosed.

The Commissioner is hereby authorized to charge any other fees due under 37 C.F.R. §1.16  
 or §1.17 during the pendency of this application to our Deposit Account No. 06-0916.

SEND ALL CORRESPONDENCE TO:  
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 Ernest F. Chapman  
 Reg. No. 25,961

Submitted: November 19, 1999

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420 Rec'd PCT/PTO 19 NOV 1999

PATENT

Attorney Docket No. 05725.0489-00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re National Stage of International )  
Application No. PCT/FR99/00542 of: )  
)  
**Gérard LANG et al.** )  
)  
Serial No.: Unassigned ) Group Art Unit: Unassigned  
)  
PCT Filed: March 11, 1999 ) Examiner: Unassigned  
)  
National Stage Entry: November 19, 1999 )  
)  
For: OXIDATION DYEING COMPOSITION )  
FOR KERATINOUS FIBRES )  
CONTAINING A 3-AMINOPYRIDINE )  
AZO DERIVATIVE AND DYEING )  
METHOD USING SAID COMPOSITION )

PRELIMINARY AMENDMENT

**Box PCT**  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

Prior to examination of the above application, please amend this application as follows:

IN THE CLAIMS:

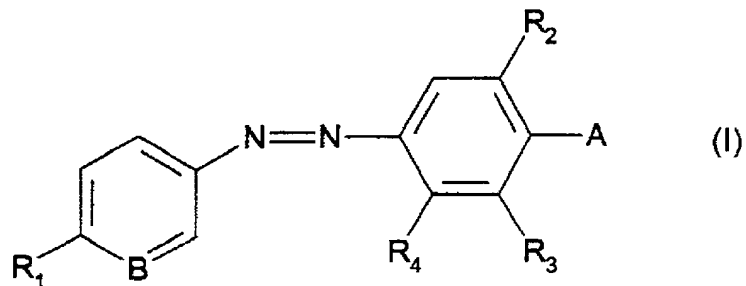
Please cancel claims 1 to 25 without prejudice or disclaimer and replace them with new claims 26 to 60 as follows:

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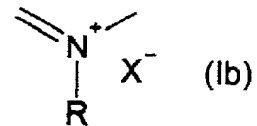
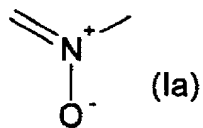
-- 26. A composition for the oxidation dyeing of keratin fibers comprising:

- a) at least one oxidation base, and
- b) as direct dye, at least one 3-aminopyridine derivative chosen from the compounds of formula (I):



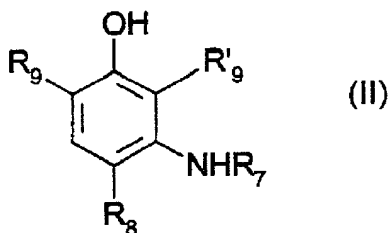
in which:

- B is chosen from formula (Ia) and (Ib):



- R is a C<sub>1</sub>-C<sub>4</sub> alkyl radical;

- $R_1$  is chosen from a hydrogen atom, a halogen atom, a  $C_1$ - $C_4$  alkyl radical, and a  $C_1$ - $C_4$  alkoxy radical;
  - $R_2$  is chosen from a hydrogen atom, a  $C_1$ - $C_4$  alkyl radical, and a  $C_1$ - $C_4$  alkoxy radical;
  - $R_4$  is chosen from a hydrogen atom, a halogen atom, a  $C_1$ - $C_4$  alkyl radical, a nitro, an amino radical and a  $(C_1$ - $C_4)$ acylamino radical;
  - $R_3$  is a hydrogen atom, or  $R_4$  and  $R_3$  together form a 6-membered unsaturated ring bearing a hydroxyl substituent chelated with one of the nitrogen atoms of the azo double bond;
  - A is a residue  $-NR_5R_6$  in which  $R_5$  is chosen from a hydrogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical and  $C_2$ - $C_4$  polyhydroxyalkyl radical and  $R_6$  is chosen from a hydrogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical, a  $C_2$ - $C_4$  polyhydroxyalkyl radical, a phenyl ring and a  $-CH_2-SO_3Na$  radical;
  - $X^-$  is chosen from a monovalent anion and a divalent anion, and
- c) at least one coupler chosen from a meta-aminophenol derivative of formula (II), and an addition salt thereof with an acid:



in which:

- $R_7$  is chosen from a hydrogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical, a  $C_2$ - $C_4$  polyhydroxyalkyl radical and a  $C_1$ - $C_4$  monoaminoalkyl radical;
- $R_8$  is chosen from a hydrogen atom, a halogen atom, a  $C_1$ - $C_4$  alkyl radical, and a  $C_1$ - $C_4$  alkoxy radical;
- $R_9$  and  $R'_9$ , which are identical or different, are chosen from a hydrogen atom, a halogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  alkoxy radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical, a  $C_2$ - $C_4$  polyhydroxyalkyl radical, a  $C_1$ - $C_4$  monohydroxyalkoxy radical and a  $C_2$ - $C_4$  polyhydroxyalkoxy radical;

with the proviso that at least one of the substituents  $R_7$ ,  $R_8$ ,  $R_9$  and  $R'_9$  is not a hydrogen atom.

27. A composition according to Claim 26, wherein said keratin fibres are human keratin fibres.

28. A composition according to Claim 27, wherein said human keratin fibres are human hair.

29. A composition according to Claim 26, wherein said halogen atom is chosen from chlorine, bromine and fluorine.

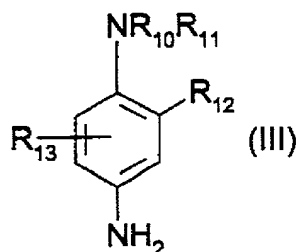
30. A composition according to Claim 26, wherein said  $X^-$  is chosen from a halogen atom, a hydroxide, a hydrogen sulfate and a  $(C_1-C_6)$ alkyl sulfate.

31. A composition according to Claim 30, wherein said halogen atom is chosen from chlorine, bromine, fluorine and iodine.

32. A composition according to Claim 30, wherein said (C<sub>1</sub>-C<sub>6</sub>)alkyl sulfate is chosen from a methyl sulfate and an ethyl sulfate.

33. A composition according to Claim 26, wherein said at least one oxidation base is chosen from a para-phenylenediamine, a double base, a para-aminophenol, an ortho-aminophenol and heterocyclic oxidation bases.

34. A composition according to Claim 33, wherein said para-phenylenediamine is chosen from a compound of formula (III), and an addition salt thereof with an acid:



in which:

- R<sub>10</sub> is chosen from a hydrogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, a C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical, a C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl radical, a (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl radical, a C<sub>1</sub>-C<sub>4</sub> alkyl radical substituted with a nitrogenous group, phenyl and 4'-aminophenyl;

- $R_{11}$  is chosen from a hydrogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical, a  $C_2$ - $C_4$  polyhydroxyalkyl radical, a  $(C_1$ - $C_4$ )alkoxy( $C_1$ - $C_4$ )alkyl radical and a  $C_1$ - $C_4$  alkyl radical substituted with a nitrogenous group;
- $R_{12}$  is chosen from a hydrogen atom, a halogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical, a  $C_1$ - $C_4$  hydroxyalkoxy radical, an acetylamino( $C_1$ - $C_4$ )alkoxy radical, a mesylamino( $C_1$ - $C_4$ )alkoxy radical and a carbamoylamino( $C_1$ - $C_4$ )alkoxy radical,
- $R_{13}$  is chosen from a hydrogen atom, a halogen atom and a  $C_1$ - $C_4$  alkyl radical.

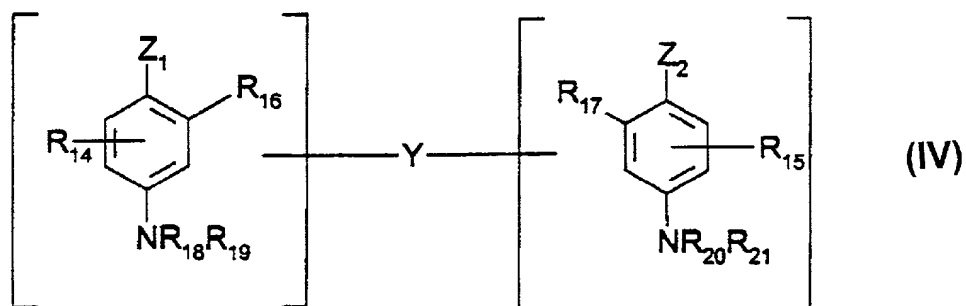
35. A composition according to Claim 34, wherein said halogen atom is chosen from chlorine, bromine, iodine and fluorine.

36. A composition according to Claim 33, wherein said para-phenylenediamine of formula (III) is chosen from para-phenylenediamine, para-tolylenediamine, 2-chloro-para-phenylenediamine, 2,3-dimethyl-para-phenylenediamine, 2,6-dimethyl-para-phenylenediamine, 2,6-diethyl-para-phenylenediamine, 2,5-dimethyl-para-phenylenediamine, N,N-dimethyl-para-phenylenediamine, N,N-diethyl-para-phenylenediamine, N,N-dipropyl-para-phenylenediamine, 4-amino-N,N-diethyl-3-methylaniline, N,N-bis( $\beta$ -hydroxyethyl)-para-phenylenediamine, 4-N,N-bis( $\beta$ -hydroxyethyl)amino-2-methylaniline, 4-N,N-bis( $\beta$ -hydroxyethyl)amino-2-chloroaniline, 2- $\beta$ -hydroxyethyl-para-phenylenediamine, 2-fluoro-para-phenylenediamine, 2-isopropyl-para-phenylenediamine, N-( $\beta$ -hydroxypropyl)-para-phenylenediamine, 2-hydroxymethyl-para-phenylenediamine, N,N-dimethyl-3-methyl-para-phenylenediamine, N-ethyl-N-( $\beta$ -



hydroxyethyl)-para-phenylenediamine, N-(b,g-dihydroxypropyl)-para-phenylenediamine, N-(4'-aminophenyl)-para-phenylenediamine, N-phenyl-para-phenylenediamine, 2-b-hydroxyethyloxy-para-phenylenediamine, 2-b-acetylaminoethyloxy-para-phenylenediamine, N-(b-methoxyethyl)-para-phenylenediamine, and addition salts thereof with an acid.

37. A composition according to Claim 33, wherein said double base is chosen from a compound of formula (IV), and an addition salt thereof with an acid:



in which:

- $Z_1$  and  $Z_2$ , which are identical or different, are chosen from a hydroxyl radical and an  $-NH_2$  radical, each of which is unsubstituted or substituted with a  $C_1$ - $C_4$  alkyl radical or with a linker arm Y;

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- $R_{14}$  and  $R_{15}$  are chosen from a hydrogen atom, a halogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical, a  $C_2$ - $C_4$  polyhydroxyalkyl radical, a  $C_1$ - $C_4$  aminoalkyl radical and a linker arm Y;
- $R_{16}$ ,  $R_{17}$ ,  $R_{18}$ ,  $R_{19}$ ,  $R_{20}$  and  $R_{21}$ , which are identical or different, are chosen from a hydrogen atom, a linker arm Y and a  $C_1$ - $C_4$  alkyl radical;
- said linker arm Y is chosen from a linear alkylene chain and a branched alkylene chain, each chain comprising from 1 to 14 carbon atoms, which can be interrupted or terminated with at least one nitrogenous group, at least one hetero atom, or a mixture thereof and optionally substituted with at least one hydroxyl radical or a  $C_1$ - $C_6$  alkoxy radical;

with the proviso that said compounds of formula (IV) comprise only one linker arm Y per molecule.

38. A composition according to Claim 37, wherein said at least one hetero atom is chosen from oxygen, sulphur and nitrogen.

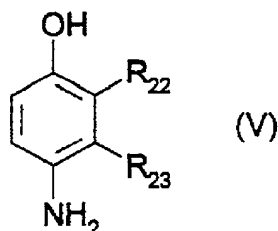
39. A composition according to Claim 37, wherein said double base of formula (IV) is chosen from N,N'-bis(b-hydroxyethyl)-N,N'-bis(4'-aminophenyl)-1,3-diaminopropanol, N,N'-bis(b-hydroxyethyl)-N,N'-bis(4'-aminophenyl)ethylenediamine, N,N'-bis(4-aminophenyl)tetramethylenediamine, N,N'-bis(b-hydroxyethyl)-N,N'-bis(4-aminophenyl)tetramethylenediamine, N,N'-bis(4-methylaminophenyl)tetramethylenediamine, N,N'-bis(ethyl)-N,N'-bis(4'-amino-3'-methylphenyl)ethylenediamine, 1,8-bis(2,5-diaminophenoxy)-3,5-dioxaoctane, and an addition salt thereof with an acid.

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40. A composition according to Claim 33, wherein said para-aminophenol is chosen from a compound of formula (V), and an addition salt thereof with an acid:



in which:

- R<sub>22</sub> is chosen from a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, a C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical, a (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl radical, a C<sub>1</sub>-C<sub>4</sub> aminoalkyl radical and a hydroxy(C<sub>1</sub>-C<sub>4</sub>)alkylamino(C<sub>1</sub>-C<sub>4</sub>)alkyl radical,
- R<sub>23</sub> is chosen from a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, a C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical, a C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl radical, a C<sub>1</sub>-C<sub>4</sub> aminoalkyl radical, a cyano(C<sub>1</sub>-C<sub>4</sub>)alkyl radical and a (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl radical,

with the proviso that at least one of the substituents R<sub>22</sub> and R<sub>23</sub> is a hydrogen atom.

41. A composition according to Claim 40, wherein said para-aminophenol of formula (V) is chosen from para-aminophenol, 4-amino-3-methylphenol, 4-amino-3-fluorophenol, 4-amino-3-hydroxymethylphenol, 4-amino-2-methylphenol, 4-amino-2-hydroxymethylphenol, 4-amino-2-methoxymethylphenol, 4-amino-2-aminomethylphenol, 4-

amino-2-(b-hydroxyethylaminomethyl)phenol, 4-amino-2-fluorophenol, and an addition salt thereof with an acid.

42. A composition according to Claim 33, wherein said ortho-aminophenol is chosen from 2-aminophenol, 2-amino-5-methylphenol, 2-amino-6-methylphenol, 5-acetamido-2-aminophenol, and an addition salt thereof with an acid.

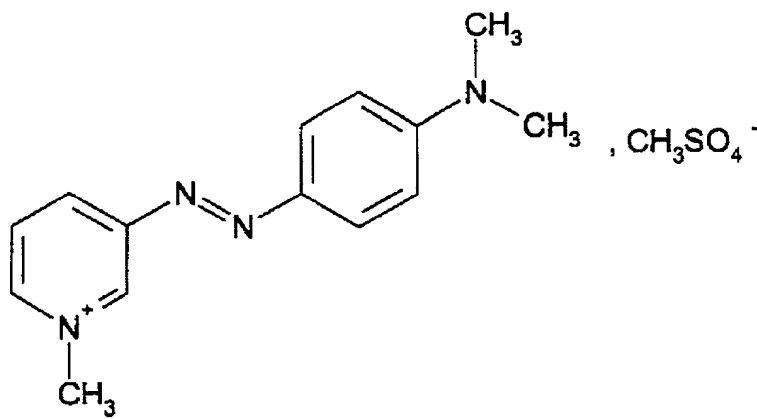
43. A composition according to Claim 33, wherein said heterocyclic oxidation bases are chosen from a pyridine derivative, a pyrimidine derivative, a pyrazole derivative, and an addition salt thereof with an acid.

44. A composition according to Claim 26, wherein said at least one oxidation base is present in an amount ranging from about 0.0005 to about 12% by weight relative to the total weight of the dye composition.

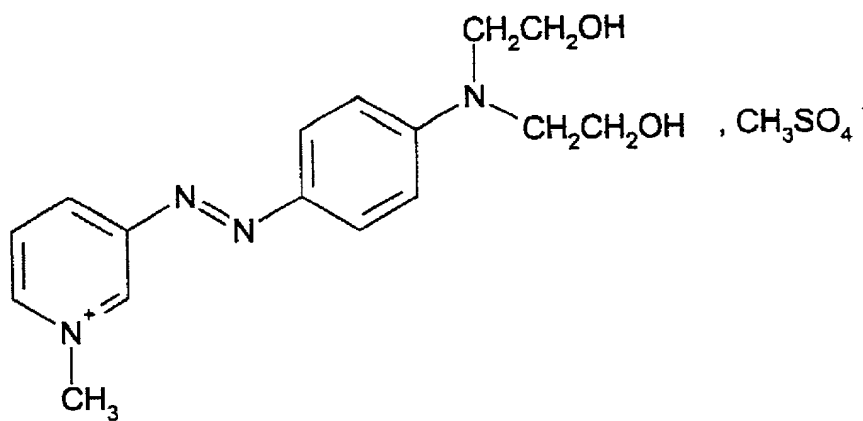
45. A composition according to Claim 44, wherein said at least one oxidation base is present in an amount ranging from about 0.005 to about 6% by weight relative to the total weight of the dye composition.

46. A composition according to Claim 26, wherein said at least one 3-aminopyridine derivative of formula (I) is chosen from:

- 4'-dimethylaminobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



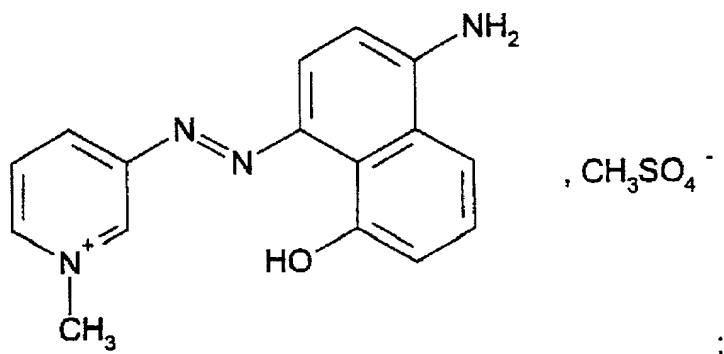
- 4'-bis(b-hydroxyethyl)aminobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



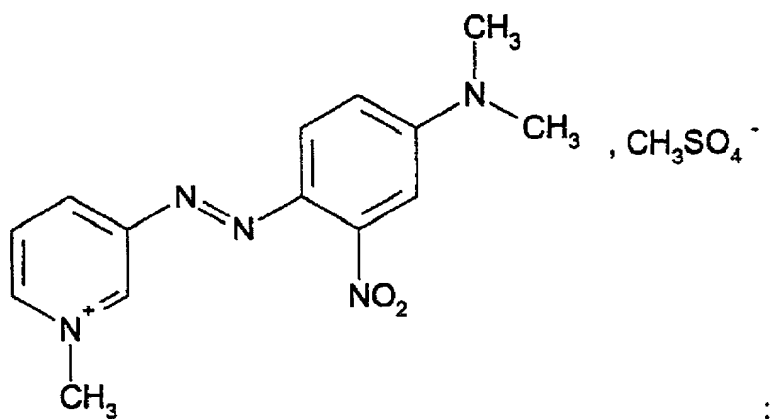
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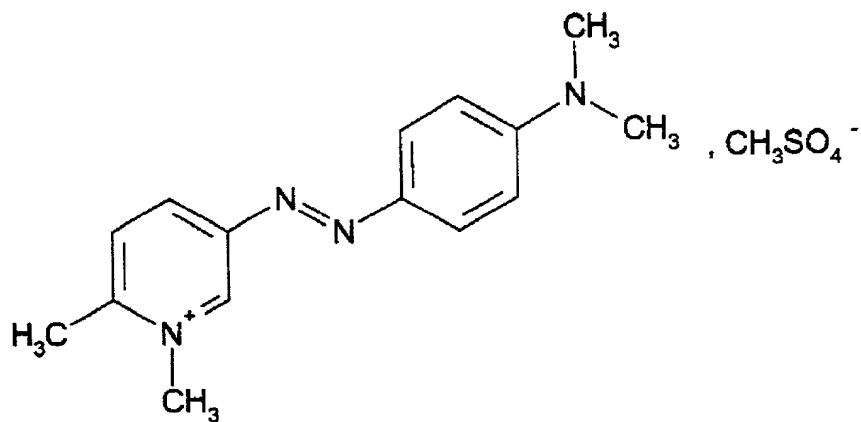
- 4'-amino-8'-hydroxynaphthalene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



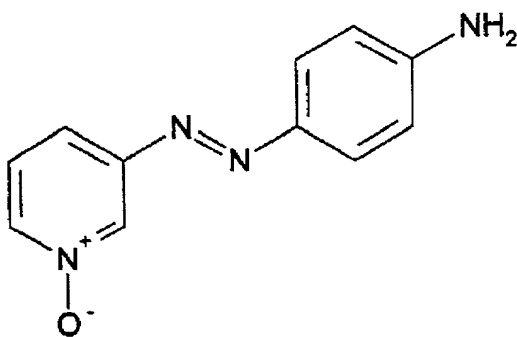
- 4'-dimethylamino-2'-nitrobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



- 4'-dimethylaminobenzene-1'-azo-1,6-dimethyl-3-pyridinium methosulphate of formula:



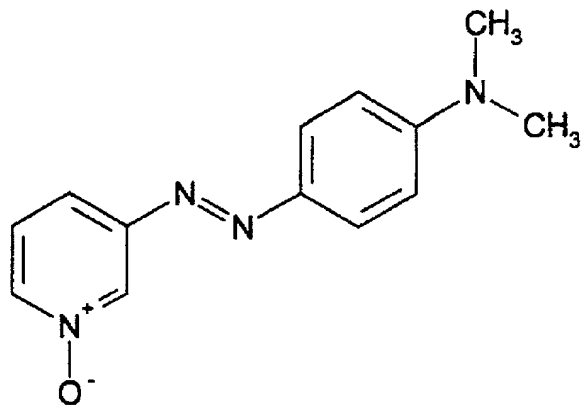
- 4'-aminobenzene-1'-azo-3-pyridine N-oxide of formula:



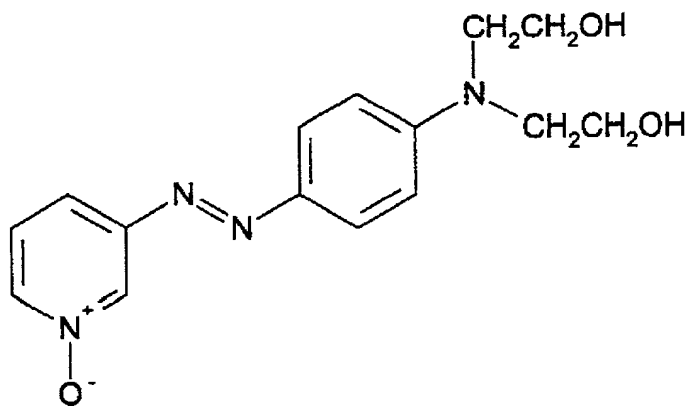
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- 4'-dimethylaminobenzene-1'-azo-3-pyridine N-oxide of formula:



- 4'-N,N-bis(b-hydroxyethyl)aminobenzene-1'-azo-3-pyridine N-oxide of formula:

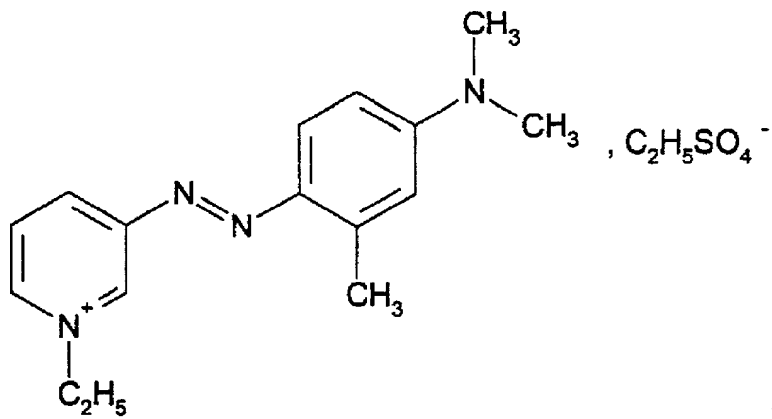


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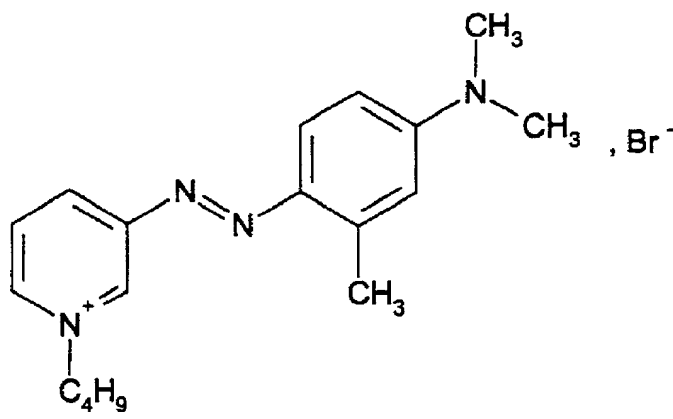
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- 4'-dimethylamino-2'-methylbenzene-1'-azo-1-ethyl-3-pyridinium ethosulphate of formula:



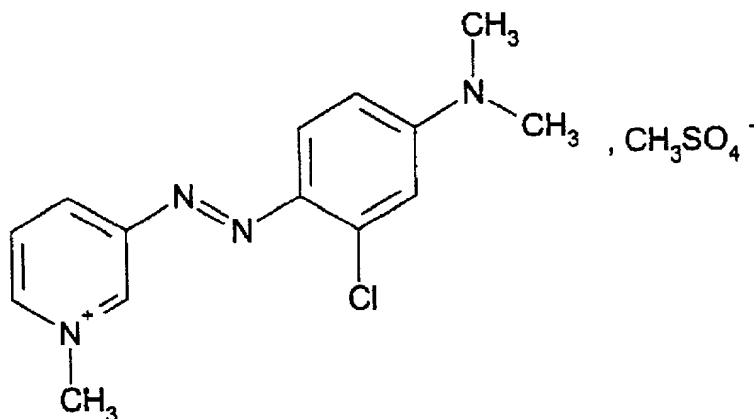
- 4'-dimethylamino-2'-methylbenzene-1'-azo-1-butyl-3-pyridinium bromide of formula:



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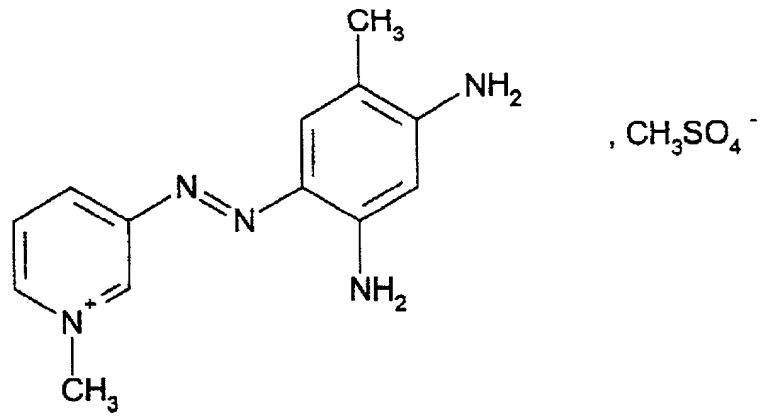
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- 4'-dimethylamino-2'-chlorobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:

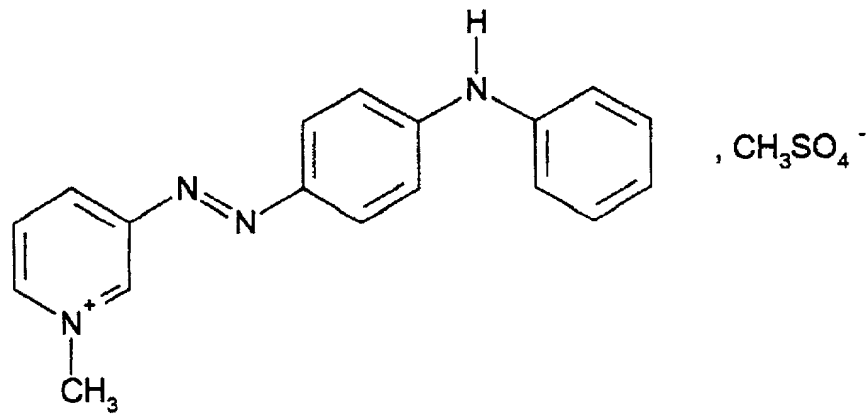


- 2',4'-diamino-5'-methylbenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:

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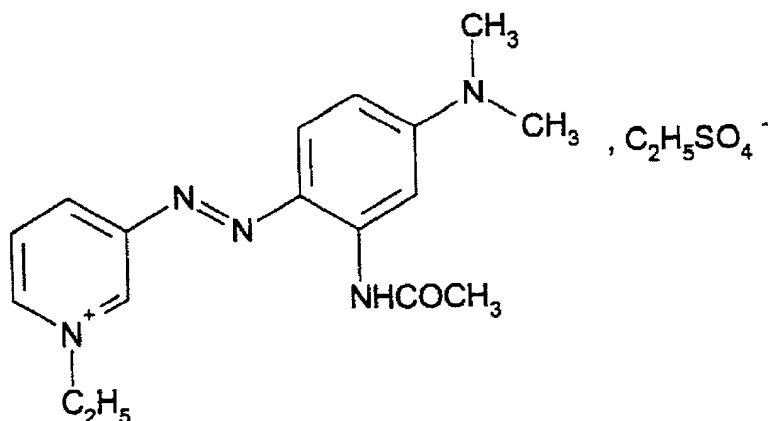
- 4'-phenylaminobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



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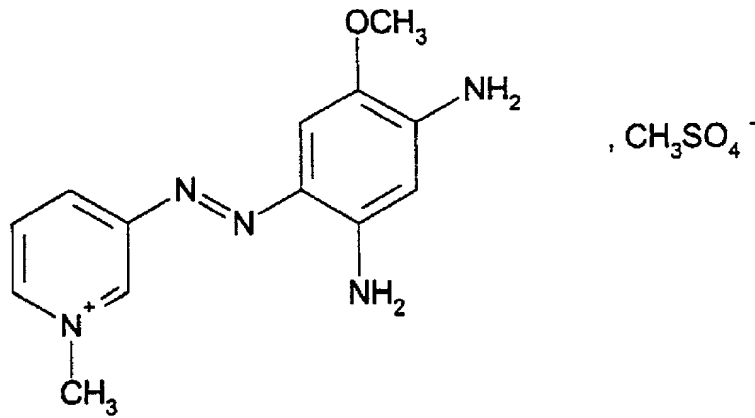
- 2'-acetylamino-4'-dimethylaminobenzene-1'-azo-1-ethyl-3-pyridinium ethosulphate of formula:



- 2',4'-diamino-5'-methoxybenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:

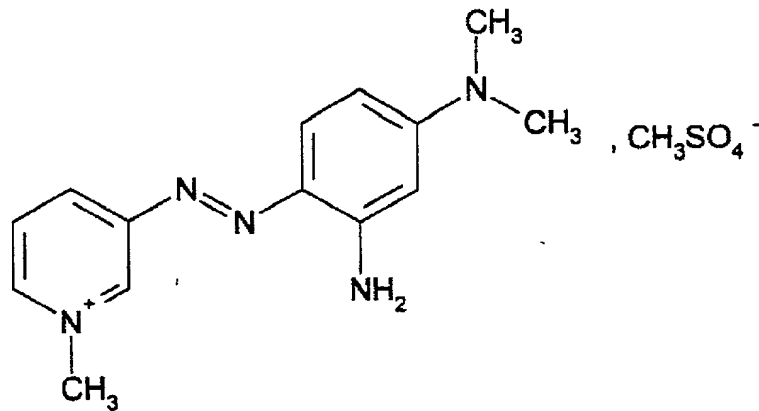
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and

- 2'-amino-4'-dimethylaminobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



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47. A composition according to Claim 26, wherein said at least one 3-amino-pyridine derivative of formula (I) is present in an amount ranging from about 0.001 to about 10% by weight relative to the total weight of the dye composition.

48. A composition according to Claim 47, wherein said at least one 3-aminopyridine derivative of formula (I) is present in an amount ranging from about 0.01 to about 5% by weight relative to the total weight of the dye composition.

49. A composition according to Claim 26, wherein said meta-aminophenol derivative of formula (II) is chosen from 5-amino-2-methoxyphenol, 5-amino-2-(b-hydroxyethyloxy)phenol, 5-amino-2-methylphenol, 5-N-(b-hydroxyethyl)amino-2-methylphenol, 5-N-(b-hydroxyethyl)amino-4-methoxy-2-methylphenol, 5-amino-4-methoxy-2-methylphenol, 5-amino-4-chloro-2-methylphenol, 5-amino-2,4-dimethoxyphenol, 5-(g-hydroxypropylamino)-2-methylphenol, 3-amino-2-chloro-6-methylphenol, 3-amino-6-chlorophenol, 3-(b-aminoethyl)amino-6-chlorophenol, and an addition salt thereof with an acid.

50. A composition according to Claim 26, wherein said meta-aminophenol derivative of formula (II) is present in an amount ranging from about 0.0001 to about 10% by weight relative to the total weight of the dye composition.

51. A composition according to Claim 50, wherein said meta-aminophenol derivative of formula (II) is present in an amount ranging from about 0.005 to about 5% by weight relative to the total weight of the dye composition.

52. A composition according to Claim 26, further comprising at least one coupler other than said meta-aminophenol derivative of formula (II), at least one direct dye other than said 3-aminopyridine derivatives of formula (I), or a mixture thereof.

53. A composition according to Claim 26, wherein said addition salt with an acid is chosen from a hydrochloride, a hydrobromide, a sulphate, a tartrate, a lactate and an acetate.

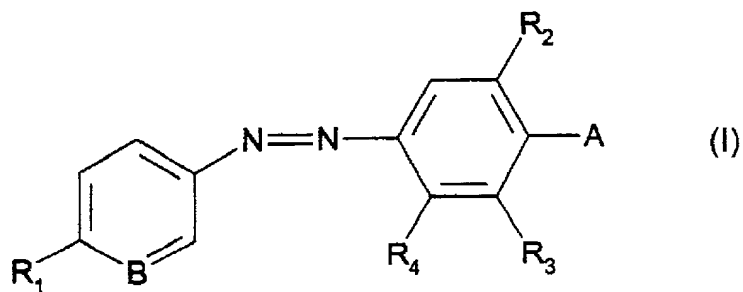
54. A composition according to Claim 26, wherein said composition is in a medium suitable for dyeing.

55. A composition according to Claim 54, wherein said medium suitable for dyeing comprises water or a mixture of water and at least one organic solvent.

56. A composition according to Claim 26, wherein said composition has a pH ranging from about 3 to about 12.

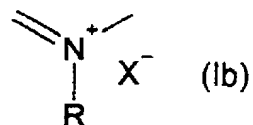
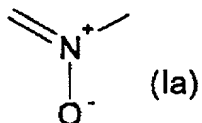
57. A process for dyeing keratin fibers comprising:

- 1) applying at least one dye composition to keratin fibers, wherein said at least one dye composition comprises
  - a) at least one oxidation base,
  - b) as a direct dye, at least one 3-aminopyridine derivative chosen from the compounds of formula (I):



in which:

- B is chosen from formula (la) and (lb):



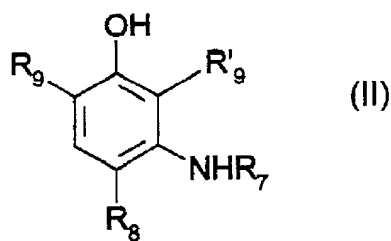
- R is a C<sub>1</sub>-C<sub>4</sub> alkyl radical;
- R<sub>1</sub> is chosen from a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, and a C<sub>1</sub>-C<sub>4</sub> alkoxy radical;
- R<sub>2</sub> is chosen from a hydrogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, and a C<sub>1</sub>-C<sub>4</sub> alkoxy radical;

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- $R_4$  is chosen from a hydrogen atom, a halogen atom, a  $C_1$ - $C_4$  alkyl radical, a nitro, an amino radical and a  $(C_1$ - $C_4)$ acylamino radical;
  - $R_3$  is a hydrogen atom, or  $R_4$  and  $R_3$  together form a 6-membered unsaturated ring bearing a hydroxyl substituent chelated with one of the nitrogen atoms of the azo double bond;
  - A is a residue  $-NR_5R_6$  in which  $R_5$  is chosen from a hydrogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical and a  $C_2$ - $C_4$  polyhydroxyalkyl radical and  $R_6$  is chosen from a hydrogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical, a  $C_2$ - $C_4$  polyhydroxyalkyl radical, a phenyl ring and a  $-CH_2-SO_3Na$  radical;
  - $X^-$  is chosen from a monovalent anion and a divalent anion, and
- c) at least one coupler chosen from a meta-aminophenol derivative of formula (II), and an addition salt thereof with an acid:



in which:

- $R_7$  is chosen from a hydrogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical, a  $C_2$ - $C_4$  polyhydroxyalkyl radical and a  $C_1$ - $C_4$  monoaminoalkyl radical;
- $R_8$  is chosen from a hydrogen atom, a halogen atom, a  $C_1$ - $C_4$  alkyl radical and a  $C_1$ - $C_4$  alkoxy radical;
- $R_9$  and  $R'_9$ , which are identical or different, are chosen from a hydrogen atom, a halogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  alkoxy radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical, a  $C_2$ - $C_4$  polyhydroxyalkyl radical, a  $C_1$ - $C_4$  monohydroxyalkoxy radical and a  $C_2$ - $C_4$  polyhydroxyalkoxy radical;

with the proviso that at least one of the substituents  $R_7$ ,  $R_8$ ,  $R_9$  and  $R'_9$  is not a hydrogen atom; and

2) developing a color at an acidic, neutral or alkaline pH with the aid of an oxidizing agent, wherein said oxidizing agent is added to said at least one dye composition at the time of application of said at least one dye composition, or wherein said oxidizing agent is present in an oxidizing composition, and wherein said oxidizing composition is applied simultaneously or sequentially with said at least one dye composition.

58. A process according to Claim 57, wherein said oxidizing agent present in the oxidizing composition is chosen from hydrogen peroxide, urea peroxide, alkali metal bromates, persalts, peracids and enzymes.

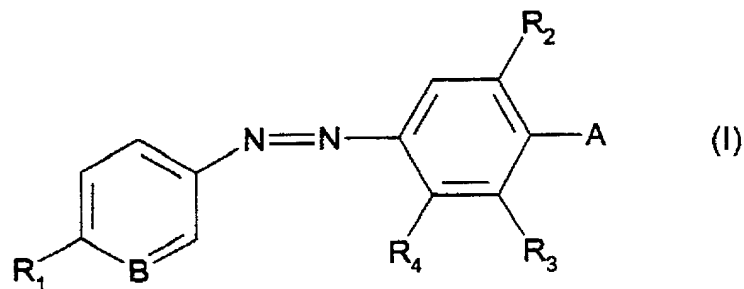
59. A process according to Claim 58, wherein said persalts are chosen from perborates, percarbonates and persulphates.

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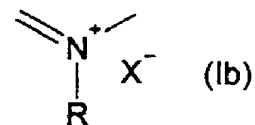
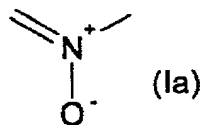
60. A multi-compartment dyeing device or kit comprising at least two compartments, wherein one compartment comprises an oxidizing composition, and another compartment comprises at least one dye composition, wherein said at least one dye composition comprises

- a) at least one oxidation base,
- b) as direct dye, at least one 3-aminopyridine derivative chosen from the compounds of formula (I):



in which:

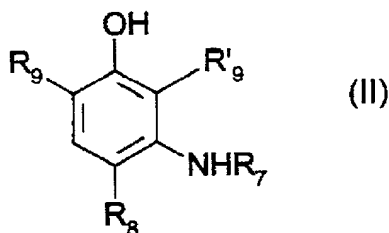
- B is chosen from formula (Ia) and (Ib):



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- R is a C<sub>1</sub>-C<sub>4</sub> alkyl radical;
  - R<sub>1</sub> is chosen from a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, and a C<sub>1</sub>-C<sub>4</sub> alkoxy radical;
  - R<sub>2</sub> is chosen from a hydrogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, and a C<sub>1</sub>-C<sub>4</sub> alkoxy radical;
  - R<sub>4</sub> is chosen from a hydrogen atom, a halogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, a nitro, an amino radical and a (C<sub>1</sub>-C<sub>4</sub>)acylamino radical;
  - R<sub>3</sub> is a hydrogen atom, or R<sub>4</sub> and R<sub>3</sub> together form a 6-membered unsaturated ring bearing a hydroxyl substituent chelated with one of the nitrogen atoms of the azo double bond;
  - A is a residue -NR<sub>5</sub>R<sub>6</sub> in which R<sub>5</sub> is chosen from a hydrogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, a C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical and C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl radical and R<sub>6</sub> is chosen from a hydrogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, a C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical, a C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl radical, a phenyl ring and a -CH<sub>2</sub>-SO<sub>3</sub>Na radical;
  - X<sup>-</sup> is chosen from a monovalent anion and a divalent anion, and
- c) at least one coupler chosen from a meta-aminophenol derivative of formula (II), and an addition salt thereof with an acid:



in which:

- $R_7$  is chosen from a hydrogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical, a  $C_2$ - $C_4$  polyhydroxyalkyl radical and a  $C_1$ - $C_4$  monoaminoalkyl radical;
- $R_8$  is chosen from a hydrogen atom, a halogen atom, a  $C_1$ - $C_4$  alkyl radical and a  $C_1$ - $C_4$  alkoxy radical;
- $R_9$  and  $R'_9$ , which are identical or different, are chosen from a hydrogen atom, a halogen atom, a  $C_1$ - $C_4$  alkyl radical, a  $C_1$ - $C_4$  alkoxy radical, a  $C_1$ - $C_4$  monohydroxyalkyl radical, a  $C_2$ - $C_4$  polyhydroxyalkyl radical, a  $C_1$ - $C_4$  monohydroxyalkoxy radical and a  $C_2$ - $C_4$  polyhydroxyalkoxy radical;

with the proviso that at least one of the substituents  $R_7$ ,  $R_8$ ,  $R_9$  and  $R'_9$  is not a hydrogen atom. —

#### REMARKS

Claims 26-60 are pending. Claims 1–25 have been canceled without prejudice or disclaimer, and rewritten as new claims 26-60 to more particularly point out and distinctly claim that which Applicant considers to be the invention, and to place the claims in better conformance with U.S. patent practice. Support for new claims 26-60 can be found throughout the specification, and in original claims 1-25. Thus, no new matter has been added by these amendments. Accordingly, Applicants now await an action on the merits.

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Respectfully submitted,

By: [Signature]

Dated: November 19, 1999

COMPOSITION FOR THE OXIDATION DYEING OF KERATIN FIBRES  
AND DYEING PROCESS USING THIS COMPOSITION

The invention relates to a composition for  
5 the oxidation dyeing of keratin fibres, and in  
particular human keratin fibres such as the hair,  
comprising, in a medium which is suitable for dyeing,  
at least one oxidation base, at least one  
3-aminopyridine derivative as direct dye, and at least  
10 one substituted meta-aminophenol as coupler, as well as  
to the dyeing process using this composition.

It is known practice to dye keratin fibres,  
and in particular human hair, with dye compositions  
containing oxidation dye precursors, in particular  
15 ortho- or para-phenylenediamines, ortho- or para-  
aminophenols and heterocyclic bases, which are  
generally referred to as oxidation bases. Oxidation dye  
precursors, or oxidation bases, are colourless or  
weakly coloured compounds which, when combined with  
20 oxidizing products, can give rise to coloured compounds  
and dyes by a process of oxidative condensation.

It is also known that the shades obtained  
with these oxidation bases can be varied by combining  
them with couplers or colour modifiers, the latter  
25 being chosen in particular from aromatic meta-diamines,  
meta-aminophenols, meta-diphenols and certain  
heterocyclic compounds.

The variety of molecules used as regards the oxidation bases and couplers allows a wide range of colours to be obtained.

It is also known that, in order to vary the shades obtained even more and to give them glints, it is possible to use, in combination with the oxidation dye precursors and couplers, direct dyes, i.e. coloured substances which provide a coloration in the absence of an oxidizing agent.

10           The great majority of these direct dyes belong to the family of nitrobenzene compounds and have the drawback, when they are incorporated into dye compositions, of leading to colorations that are not sufficiently fast, in particular with respect to  
15 shampoos.

The so-called "permanent" coloration obtained by means of these oxidation dyes must moreover satisfy a certain number of requirements. Thus, it must be able to give shades of the desired intensity and it must be  
20 able to withstand external agents (light, bad weather, washing, permanent-waving, perspiration and rubbing).

The dyes must also make it possible to cover white hair, and, finally, they must be as unselective as possible, i.e. they must give the smallest possible  
25 differences in colour all the way along the same keratin fibre, which may indeed be differently sensitized (i.e. damaged) between its tip and its root.



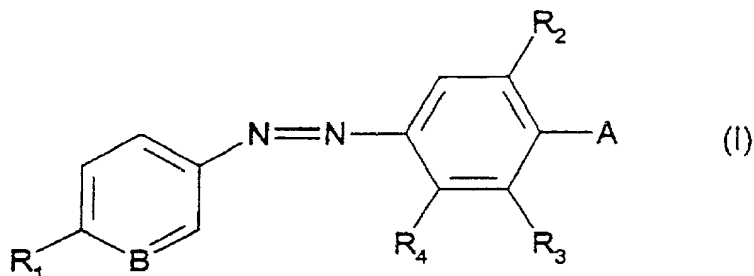
Compositions for the oxidation dyeing of keratin fibres containing a combination of a benzenic oxidation base, a direct dye of the 3-aminopyridine family and an unsubstituted meta-aminophenol as coupler  
5 have already been proposed, in particular in patent application FR-A-2,285,851. However, the colorations obtained using such compositions are not entirely satisfactory, in particular from the point of view of their chromaticity and their fastness.

10           The Applicant has now discovered that it is possible to obtain novel dyes which are capable of giving intense and chromatic colorations, which show little selectivity and which satisfactorily withstand the various attacking factors to which the fibres may  
15 be subjected, by combining at least one oxidation base, at least one suitably selected 3-aminopyridine derivative as direct dye, and at least one suitably selected meta-aminophenol derivative.

          This discovery forms the basis of the present  
20 invention.

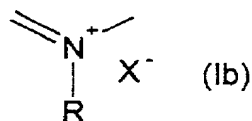
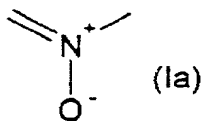
          A first subject of the invention is thus a composition for the oxidation dyeing of keratin fibres, and in particular of human keratin fibres such as the hair, characterized in that it comprises, in a medium  
25 which is suitable for dyeing:  
- at least one oxidation base,

- as direct dye, at least one 3-aminopyridine derivative chosen from the compounds of formula (I) below:



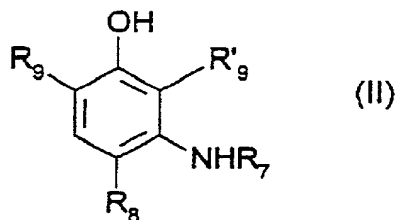
5 in which:

- B represents a group of formula (Ia) or (Ib) below:



- R represents a C<sub>1</sub>-C<sub>4</sub> alkyl radical;
- R<sub>1</sub> represents a hydrogen or halogen atom such as chlorine, bromine or fluorine, or a C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> alkoxy radical;
- R<sub>2</sub> represents a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> alkoxy radical;
- R<sub>4</sub> represents a hydrogen or halogen atom such as chlorine, bromine or fluorine, or a C<sub>1</sub>-C<sub>4</sub> alkyl, nitro, amino or (C<sub>1</sub>-C<sub>4</sub>)acylamino radical;
- R<sub>3</sub> represents a hydrogen atom or else R<sub>4</sub> and R<sub>3</sub> together form a 6-membered unsaturated ring bearing a hydroxyl substituent chelated with one of the nitrogen atoms of the azo double bond;

- A represents a residue  $-NR_5R_6$  in which  $R_5$  represents a hydrogen atom or a  $C_1$ - $C_4$  alkyl,  $C_1$ - $C_4$  monohydroxyalkyl or  $C_2$ - $C_4$  polyhydroxyalkyl radical;  $R_6$  represents a hydrogen atom, a  $C_1$ - $C_4$  alkyl,  $C_1$ - $C_4$  monohydroxyalkyl or  $C_2$ - $C_4$  polyhydroxyalkyl radical, a phenyl ring or a  $-CH_2-SO_3Na$  radical;
- $X^-$  represents a monovalent or divalent anion and is preferably chosen from a halogen atom such as chlorine, bromine, fluorine or iodine, a hydroxide, a hydrogen sulphate or a  $(C_1-C_6)$  alkyl sulphate such as, for example, a methyl sulphate or an ethyl sulphate, and
- at least one coupler chosen from the meta-aminophenol derivatives of formula (II) below, and the addition salts thereof with an acid:



in which:

- $R_7$  represents a hydrogen atom or a  $C_1$ - $C_4$  alkyl,  $C_1$ - $C_4$  monohydroxyalkyl,  $C_2$ - $C_4$  polyhydroxyalkyl or  $C_1$ - $C_4$  monoaminoalkyl radical;
- $R_8$  represents a hydrogen atom, a  $C_1$ - $C_4$  alkyl or  $C_1$ - $C_4$  alkoxy radical or a halogen atom chosen from chlorine, bromine and fluorine,

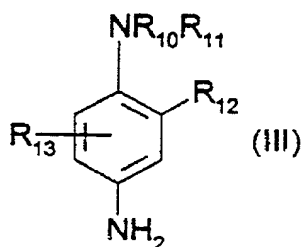
- R<sub>9</sub> and R'<sub>9</sub>, which may be identical or different, represent a hydrogen or halogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl, C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkoxy or C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkoxy radical;  
5 it being understood that at least one of the radicals R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub> and R'<sub>9</sub> is other than a hydrogen atom.

The dye composition in accordance with the invention gives intense, chromatic colorations which  
10 show little selectivity and excellent properties of resistance both with respect to atmospheric agents such as light and bad weather, and with respect to perspiration and the various treatments to which the hair may be subjected. These properties are  
15 particularly noteworthy as regards the chromaticity.

A subject of the invention is also a process for the oxidation dyeing of keratin fibres using this dye composition.

The nature of the oxidation base(s) used in  
20 the ready-to-use dye composition is not critical. They can be chosen, in particular, from para-phenylenediamines, double bases, para-aminophenols, ortho-aminophenols and heterocyclic oxidation bases.

Among the para-phenylenediamines which can be  
25 used as oxidation base in the dye compositions in accordance with the invention, mention may be made in particular of the compounds of formula (III) below, and the addition salts thereof with an acid:



in which:

- R<sub>10</sub> represents a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl radical, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical, C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl radical, (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl radical, C<sub>1</sub>-C<sub>4</sub> alkyl radical substituted with a nitrogenous group, phenyl or 4'-aminophenyl;
- R<sub>11</sub> represents a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl radical, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical, C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl radical, (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl radical or C<sub>1</sub>-C<sub>4</sub> alkyl radical substituted with a nitrogenous group;
- R<sub>12</sub> represents a hydrogen atom, a halogen atom such as a chlorine, bromine, iodine or fluorine atom, or a C<sub>1</sub>-C<sub>4</sub> alkyl radical, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical, C<sub>1</sub>-C<sub>4</sub> hydroxyalkoxy radical, acetylamino(C<sub>1</sub>-C<sub>4</sub>)alkoxy, mesylamino(C<sub>1</sub>-C<sub>4</sub>)alkoxy or carbamoylamino(C<sub>1</sub>-C<sub>4</sub>)alkoxy radical,
- R<sub>13</sub> represents a hydrogen or halogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl radical.

Among the nitrogenous groups of formula (III) above, mention may be made in particular of amino, mono(C<sub>1</sub>-C<sub>4</sub>)alkylamino, di(C<sub>1</sub>-C<sub>4</sub>)alkylamino,

tri(C<sub>1</sub>-C<sub>4</sub>)alkylamino, monohydroxy(C<sub>1</sub>-C<sub>4</sub>)alkylamino, imidazolinium and ammonium radicals.

Among the para-phenylenediamines of formula (III) above, mention may be made more particularly of

5 para-phenylenediamine, para-tolylenediamine, 2-chloro-para-phenylenediamine, 2,3-dimethyl-para-phenylenediamine, 2,6-dimethyl-para-phenylenediamine, 2,6-diethyl-para-phenylenediamine, 2,5-dimethyl-para-phenylenediamine, N,N-dimethyl-para-phenylenediamine,

10 N,N-diethyl-para-phenylenediamine, N,N-dipropyl-para-phenylenediamine, 4-amino-N,N-diethyl-3-methylaniline, N,N-bis(β-hydroxyethyl)-para-phenylenediamine, 4-N,N-bis(β-hydroxyethyl)amino-2-methylaniline, 4-N,N-bis(β-hydroxyethyl)amino-2-chloroaniline, 2-β-hydroxyethyl-

15 para-phenylenediamine, 2-fluoro-para-phenylenediamine, 2-isopropyl-para-phenylenediamine, N-(β-hydroxypropyl)-para-phenylenediamine, 2-hydroxymethyl-para-phenylenediamine, N,N-dimethyl-3-methyl-para-phenylenediamine, N-ethyl-N-(β-hydroxyethyl)-para-

20 phenylenediamine, N-(β,γ-dihydroxypropyl)-para-phenylenediamine, N-(4'-aminophenyl)-para-phenylenediamine, N-phenyl-para-phenylenediamine, 2-β-hydroxyethyloxy-para-phenylenediamine, 2-β-acetylaminooethyloxy-para-phenylenediamine and N-(β-

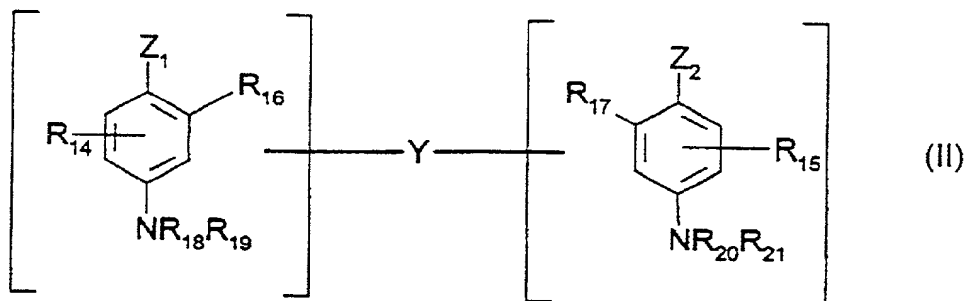
25 methoxyethyl)-para-phenylenediamine, and the addition salts thereof with an acid.

Among the para-phenylenediamines of formula (III) above, the ones most particularly preferred are

para-phenylenediamine, para-tolylenediamine,  
 2-isopropyl-para-phenylenediamine, 2- $\beta$ -hydroxyethyl-  
 para-phenylenediamine, 2- $\beta$ -hydroxyethyloxy-para-  
 phenylenediamine, 2,6-dimethyl-para-phenylenediamine,  
 5 2,6-diethyl-para-phenylenediamine, 2,3-dimethyl-para-  
 phenylenediamine, N,N-bis( $\beta$ -hydroxyethyl)-para-  
 phenylenediamine, 2-chloro-para-phenylenediamine and  
 2- $\beta$ -acetylaminioethyloxy-para-phenylenediamine, and the  
 addition salts thereof with an acid.

10 According to the invention, the term "double  
 bases" means compounds comprising at least two aromatic  
 nuclei on which amino and/or hydroxyl groups are borne.

Among the double bases which can be used as  
 oxidation bases in the dye compositions in accordance  
 15 with the invention, mention may be made in particular  
 of the compounds corresponding to the formula (IV)  
 below, and the addition salts thereof with an acid:



in which:

- 20 -  $\text{Z}_1$  and  $\text{Z}_2$ , which may be identical or different,  
 represent a hydroxyl or  $-\text{NH}_2$  radical which can be  
 substituted with a  $\text{C}_1$ - $\text{C}_4$  alkyl radical or with a  
 linker arm Y;

- the linker arm Y represents a linear or branched alkylene chain comprising from 1 to 14 carbon atoms, which can be interrupted or terminated with one or more nitrogenous groups and/or with one or more hetero atoms such as oxygen, sulphur or nitrogen atoms, and optionally substituted with one or more hydroxyl or C<sub>1</sub>-C<sub>6</sub> alkoxy radicals;
  - R<sub>14</sub> and R<sub>15</sub> represent a hydrogen or halogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical, C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl radical or C<sub>1</sub>-C<sub>4</sub> aminoalkyl radical or a linker arm Y;
  - R<sub>16</sub>, R<sub>17</sub>, R<sub>18</sub>, R<sub>19</sub>, R<sub>20</sub> and R<sub>21</sub>, which may be identical or different, represent a hydrogen atom, a linker arm Y or a C<sub>1</sub>-C<sub>4</sub> alkyl radical;
- it being understood that the compounds of formula (IV) comprise only one linker arm Y per molecule.

Among the nitrogenous groups of formula (IV) above, mention may be made in particular of amino, mono(C<sub>1</sub>-C<sub>4</sub>)alkylamino, di(C<sub>1</sub>-C<sub>4</sub>)alkylamino, tri(C<sub>1</sub>-C<sub>4</sub>)alkylamino, monohydroxy(C<sub>1</sub>-C<sub>4</sub>)alkylamino, imidazolinium and ammonium radicals.

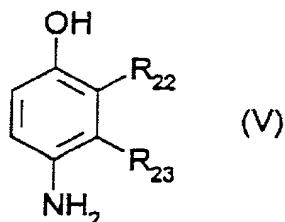
Among the double bases of formula (IV) above, mention may be made more particularly of N,N'-bis(β-hydroxyethyl)-N,N'-bis(4'-aminophenyl)-1,3-diaminopropanol, N,N'-bis(β-hydroxyethyl)-N,N'-bis(4'-aminophenyl)ethylenediamine, N,N'-bis(4-aminophenyl)tetramethylenediamine, N,N'-bis(β-hydroxyethyl)-N,N'-bis(4-aminophenyl)-



tetramethylenediamine, N,N'-bis(4-methylaminophenyl)tetramethylenediamine, N,N'-bis(ethyl)-N,N'-bis(4'-amino-3'-methylphenyl)ethylenediamine and 1,8-bis(2,5-diaminophenoxy)-3,5-dioxaoctane, and the addition salts thereof with an acid.

Among these double bases of formula (IV), N,N'-bis( $\beta$ -hydroxyethyl)-N,N'-bis(4'-aminophenyl)-1,3-diaminopropanol and 1,8-bis(2,5-diaminophenoxy)-3,5-dioxaoctane, or one of the addition salts thereof with an acid, are particularly preferred.

Among the para-aminophenols which can be used as oxidation bases in the dye compositions in accordance with the invention, mention may be made in particular of the compounds of formula (V) below, and the addition salts thereof with an acid:



in which:

- 20 - R<sub>22</sub> represents a hydrogen or halogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl, (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl, C<sub>1</sub>-C<sub>4</sub> aminoalkyl or hydroxy(C<sub>1</sub>-C<sub>4</sub>)alkylamino(C<sub>1</sub>-C<sub>4</sub>)alkyl radical,

- R<sub>23</sub> represents a hydrogen or halogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl, C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl, C<sub>1</sub>-C<sub>4</sub> aminoalkyl, cyano(C<sub>1</sub>-C<sub>4</sub>)alkyl or (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl radical,

5 it being understood that at least one of the radicals R<sub>22</sub> and R<sub>23</sub> represents a hydrogen atom.

Among the para-aminophenols of formula (V) above, mention may be made more particularly of para-aminophenol, 4-amino-3-methylphenol, 4-amino-3-  
 10 fluorophenol, 4-amino-3-hydroxymethylphenol, 4-amino-2-methylphenol, 4-amino-2-hydroxymethylphenol, 4-amino-2-methoxymethylphenol, 4-amino-2-aminomethylphenol, 4-amino-2-( $\beta$ -hydroxyethylaminomethyl)phenol and 4-amino-2-fluorophenol, and the addition salts thereof with an  
 15 acid.

Among the ortho-aminophenols which can be used as oxidation bases in the dye compositions in accordance with the invention, mention may be made more particularly of 2-aminophenol, 2-amino-5-methylphenol,  
 20 2-amino-6-methylphenol and 5-acetamido-2-aminophenol, and the addition salts thereof with an acid.

Among the heterocyclic bases which can be used as oxidation bases in the dye compositions in accordance with the invention, mention may be made more  
 25 particularly of pyridine derivatives, pyrimidine derivatives and pyrazole derivatives, and the addition salts thereof with an acid.

Among the pyridine derivatives, mention may be made more particularly of the compounds described, for example, in GB patents 1,026,978 and 1,153,196, such as 2-5-diaminopyridine, 2-(4-methoxyphenyl)amino-  
 5 3-aminopyridine, 2,3-diamino-6-methoxypyridine, 2-( $\beta$ -methoxyethyl)amino-3-amino-6-methoxypyridine and 3,4-diaminopyridine, and the addition salts thereof with an acid.

Among the pyrimidine derivatives, mention may  
 10 be made more particularly of the compounds described, for example, in German patent DE 2,359,399 or Japanese patents JP 88-169,571 and JP 91-333,495 or patent applications WO 96/15765, such as 2,4,5,6-tetraaminopyrimidine, 4-hydroxy-2,5,6-  
 15 triaminopyrimidine, 2-hydroxy-4,5,6-triaminopyrimidine, 2,4-dihydroxy-5,6-diaminopyrimidine and 2,5,6-traminopyrimidine, and pyrazolopyrimidine derivatives, such as those mentioned in patent application FR-A-2,750,048 and among which mention may be made of  
 20 pyrazolo[1,5-a]pyrimidine-3,7-diamine; 2,5-dimethylpyrazolo[1,5-a]pyrimidine-3,7-diamine; pyrazolo[1,5-a]pyrimidine-3,5-diamine; 2,7-dimethylpyrazolo[1,5-a]pyrimidine-3,5-diamine; 3-aminopyrazolo[1,5-a]pyrimidin-7-ol; 3-  
 25 aminopyrazolo[1,5-a]pyrimidin-5-ol; 2-(3-aminopyrazolo[1,5-a]pyrimidin-7-ylamino)ethanol, 2-(7-aminopyrazolo[1,5-a]pyrimidin-3-ylamino)ethanol, 2-[(3-aminopyrazolo[1,5-a]pyrimidin-7-yl)-(2-

hydroxyethyl)amino]ethanol, 2-[(7-aminopyrazolo[1,5-a]pyrimidin-3-yl)-(2-hydroxyethyl)amino]ethanol, 5,6-dimethylpyrazolo[1,5-a]pyrimidine-3,7-diamine, 2,6-dimethylpyrazolo[1,5-a]pyrimidine-3,7-diamine and 2,5, 5 N7,N7-tetramethylpyrazolo[1,5-a]pyrimidine-3,7-diamine, and the addition salts thereof and the tautomeric forms thereof, when a tautomeric equilibrium exists, and the addition salts thereof with an acid.

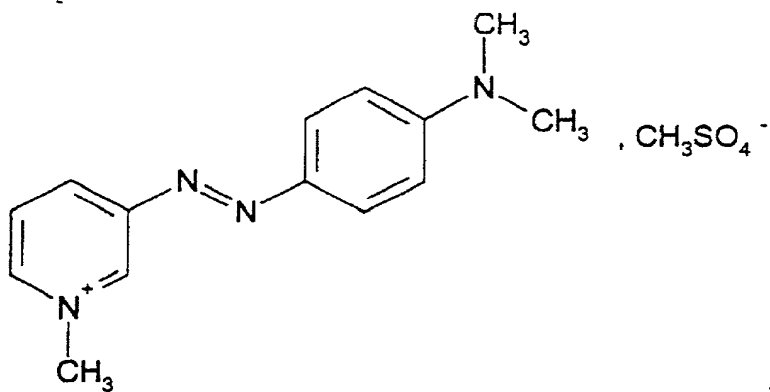
Among the pyrazole derivatives, mention may  
 10 be made more particularly of the compounds described in patents DE 3,843,892 and DE 4,133,957 and patent applications WO 94/08969, WO 94/08970, FR-A-2,733,749 and DE 195 43 988, such as 4,5-diamino-1-methylpyrazole, 3,4-diaminopyrazole, 4,5-diamino-1-(4'-chlorobenzyl)pyrazole, 4,5-diamino-1,3-  
 15 dimethylpyrazole, 4,5-diamino-3-methyl-1-phenylpyrazole, 4,5-diamino-1-methyl-3-phenylpyrazole, 4-amino-1,3-dimethyl-5-hydrazinopyrazole, 1-benzyl-4,5-diamino-3-methylpyrazole, 4,5-diamino-3-tert-butyl-1-  
 20 methylpyrazole, 4,5-diamino-1-tert-butyl-3-methylpyrazole, 4,5-diamino-1-( $\beta$ -hydroxyethyl)-3-methylpyrazole, 4,5-diamino-1-ethyl-3-methylpyrazole, 4,5-diamino-1-ethyl-3-(4'-methoxyphenyl)pyrazole, 4,5-diamino-1-ethyl-3-hydroxymethylpyrazole, 4,5-diamino-3-  
 25 hydroxymethyl-1-methylpyrazole, 4,5-diamino-3-hydroxymethyl-1-isopropylpyrazole, 4,5-diamino-3-methyl-1-isopropylpyrazole, 4-amino-5-(2'-aminoethyl)amino-1,3-dimethylpyrazole,

3,4,5-triaminopyrazole, 1-methyl-3,4,5-triaminopyrazole, 3,5-diamino-1-methyl-4-methylaminopyrazole and 3,5-diamino-4-( $\beta$ -hydroxyethyl)amino-1-methylpyrazole, and the addition  
 5 salts thereof with an acid.

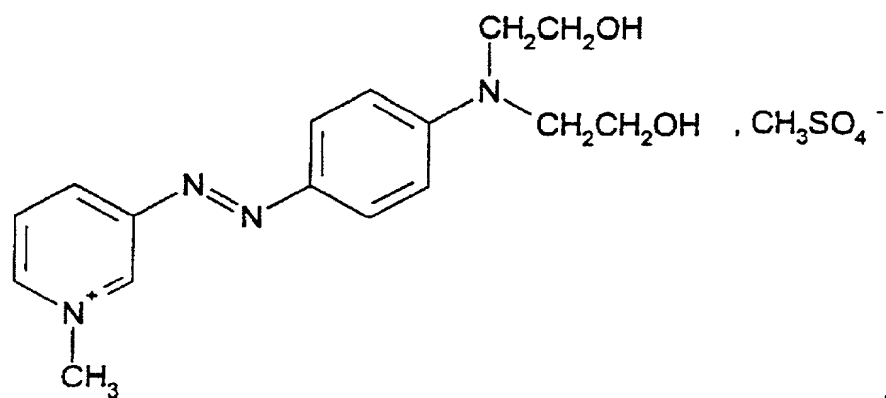
The oxidation base(s) preferably represent(s) from 0.0005 to 12% by weight approximately relative to the total weight of the dye composition in accordance with the invention, and even more preferably from 0.005  
 10 to 6% by weight approximately relative to this weight.

The 3-aminopyridine derivative(s) of formula (I) in accordance with the invention is (are) preferably chosen from:

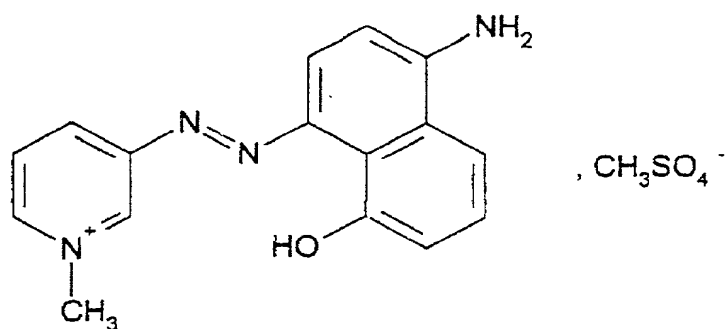
- 4'-dimethylaminobenzene-1'-azo-1-methyl-3-pyridinium  
 15 methosulphate of formula:



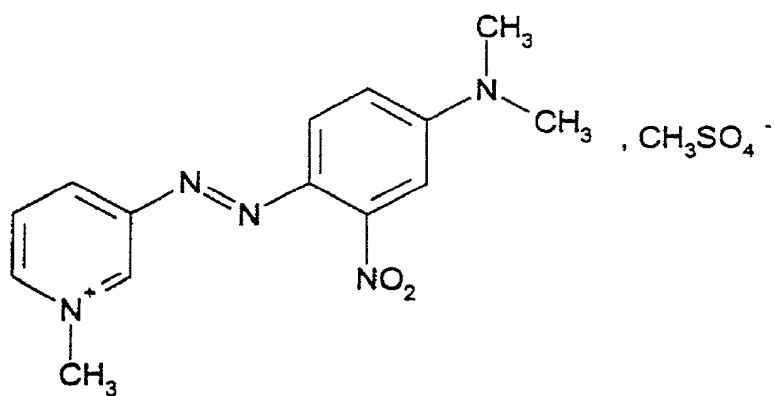
- 4'-bis( $\beta$ -hydroxyethyl)aminobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



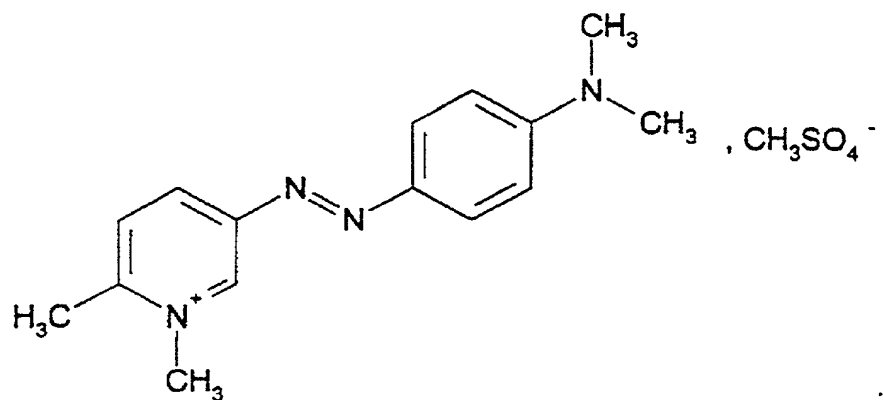
- 4'-amino-8'-hydroxynaphthalene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



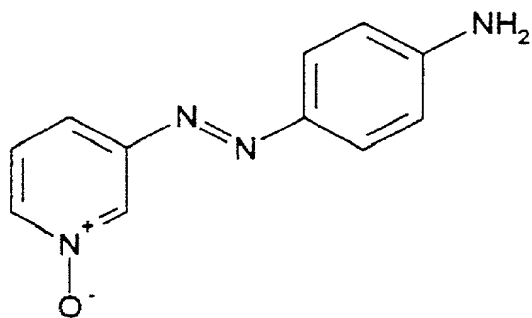
- 5 - 4'-dimethylamino-2'-nitrobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



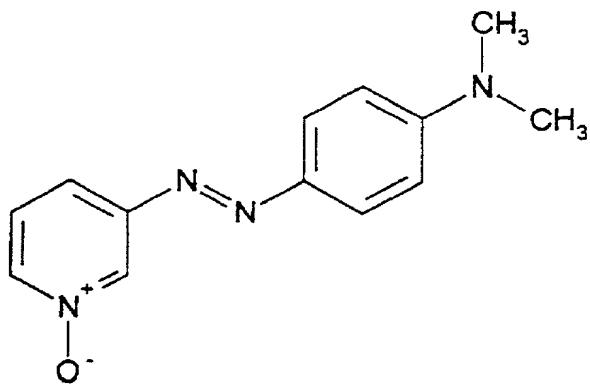
- 4'-dimethylaminobenzene-1'-azo-1,6-dimethyl-3-pyridinium methosulphate of formula:



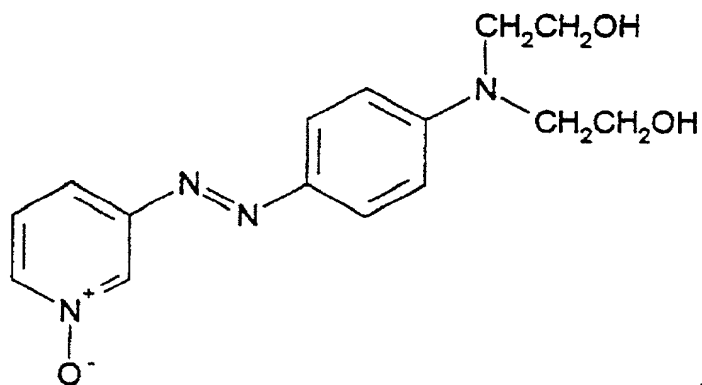
- 4'-aminobenzene-1'-azo-3-pyridine N-oxide of formula:



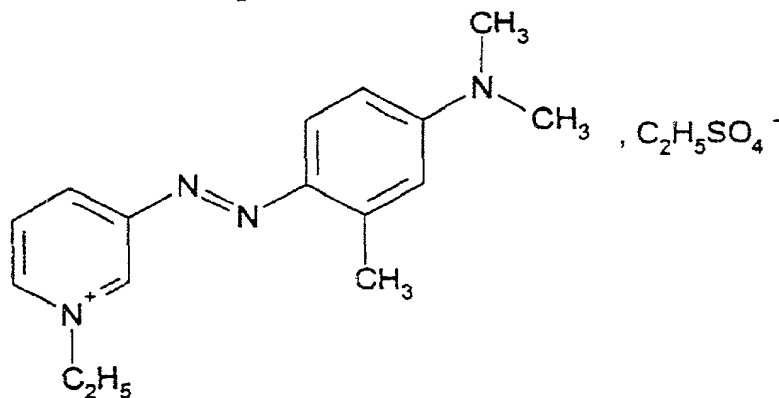
5      - 4'-dimethylaminobenzene-1'-azo-3-pyridine N-oxide of formula:



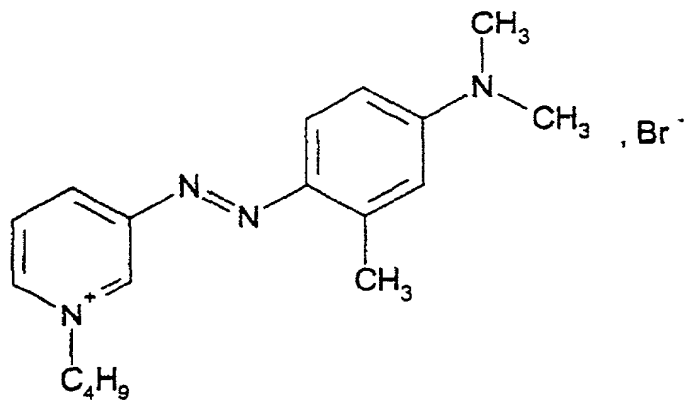
- 4'-N,N-bis(β-hydroxyethyl)aminobenzene-1'-azo-3-pyridine N-oxide of formula:



- 4'-dimethylamino-2'-methylbenzene-1'-azo-1-ethyl-3-pyridinium ethosulphate of formula:

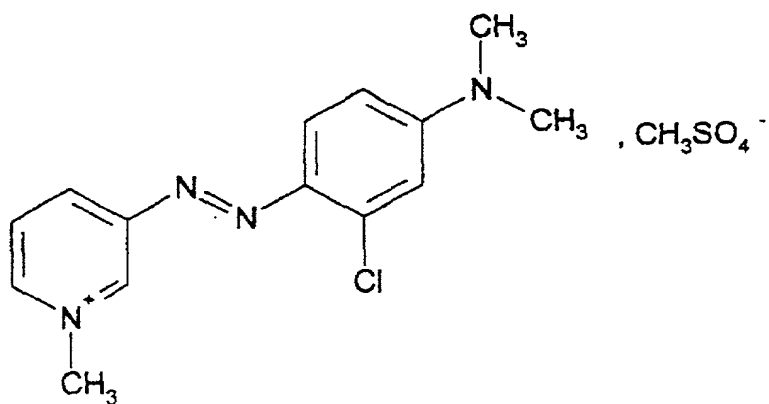


- 5 - 4'-dimethylamino-2'-methylbenzene-1'-azo-1-butyl-3-pyridinium bromide of formula:

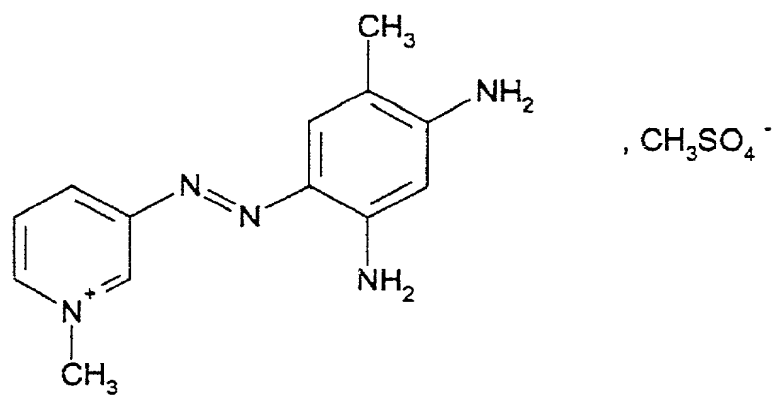


- 4'-dimethylamino-2'-chlorobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:

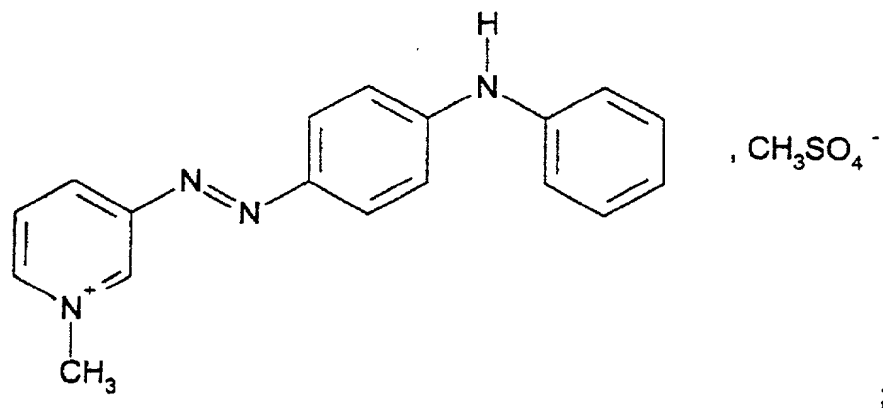




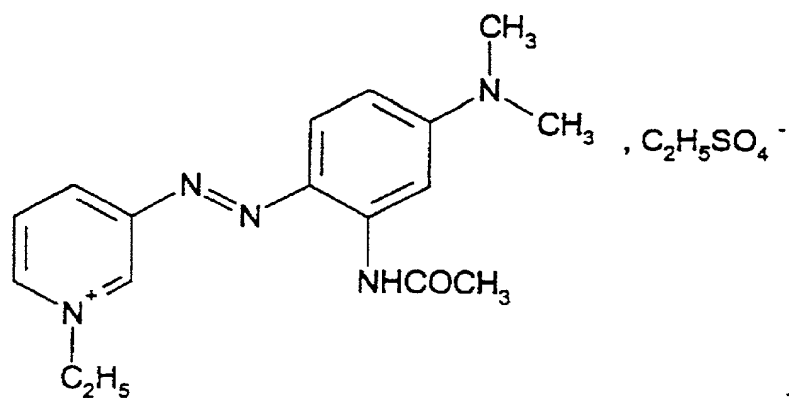
- 2',4'-diamino-5'-methylbenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



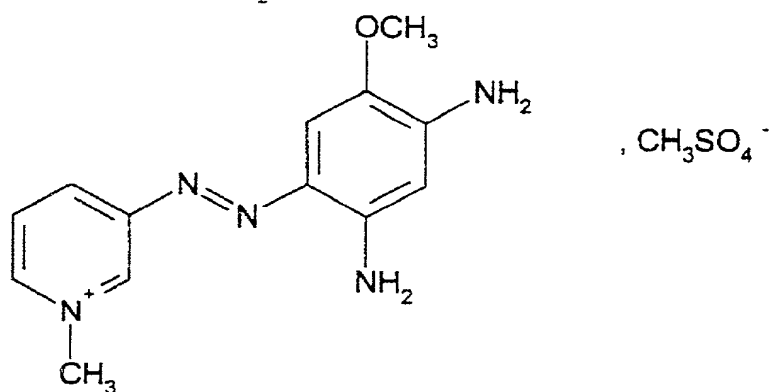
5 - 4'-phenylaminobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



- 2'-acetylamino-4'-dimethylaminobenzene-1'-azo-1-ethyl-3-pyridinium ethosulphate of formula:

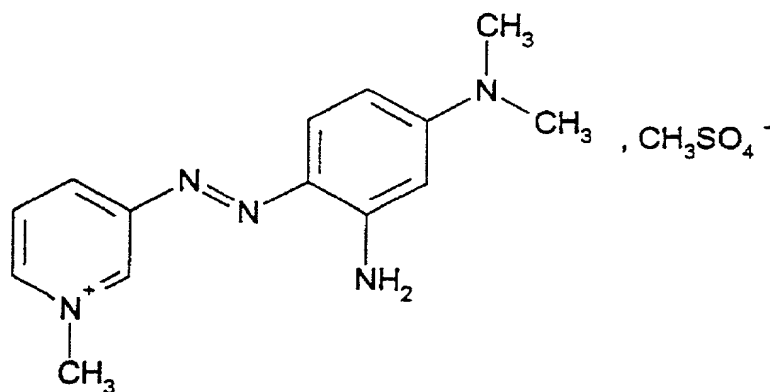


- 2',4'-diamino-5'-methoxybenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



5 and

- 2'-amino-4'-dimethylaminobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



The 3-aminopyridine derivative(s) of formula  
 10 (I) used according to the invention preferably

represent(s) from 0.001 to 10% by weight approximately relative to the total weight of the dye composition, and even more preferably from 0.01 to 5% by weight approximately relative to this weight.

5           Among the meta-aminophenols of formula (II) above, mention may be made more particularly of 5-amino-2-methoxyphenol, 5-amino-2-( $\beta$ -hydroxyethyloxy)phenol, 5-amino-2-methylphenol, 5-N-( $\beta$ -hydroxyethyl)amino-2-methylphenol, 5-N-( $\beta$ -  
10 hydroxyethyl)amino-4-methoxy-2-methylphenol, 5-amino-4-methoxy-2-methylphenol, 5-amino-4-chloro-2-methylphenol, 5-amino-2,4-dimethoxyphenol, 5-( $\gamma$ -hydroxypropylamino)-2-methylphenol, 3-amino-2-chloro-6-methylphenol, 3-amino-6-chlorophenol and 3-( $\beta$ -  
15 aminoethyl)amino-6-chlorophenol, and the addition salts thereof with an acid.

          The meta-aminophenol derivative(s) of formula (II) in accordance with the invention preferably represent(s) from 0.0001 to 10% by weight approximately  
20 relative to the total weight of the dye composition and even more preferably from 0.005 to 5% by weight approximately relative to this weight.

          The dye composition in accordance with the invention can also contain one or more couplers other  
25 than the meta-aminophenol derivatives of formula (II) and/or one or more direct dyes other than the 3-aminopyridine derivatives of formula (I), in

particular to modify the shades or to enrich them with glints.

Among the couplers which may also be present in the dye composition in accordance with the invention, mention may be made in particular of meta-phenylenediamines, meta-diphenols and heterocyclic couplers, and the addition salts thereof with an acid.

When they are present, these additional couplers preferably represent from 0.0001 to 10% by weight approximately relative to the total weight of the dye composition and even more preferably from 0.005 to 5% by weight approximately relative to this weight.

In general, the addition salts with an acid which can be used in the context of the dye compositions of the invention (oxidation bases and couplers) are chosen in particular from the hydrochlorides, hydrobromides, sulphates, tartrates, lactates and acetates.

The medium which is suitable for dyeing (or support) for the dye composition in accordance with the invention generally consists of water or of a mixture of water and at least one organic solvent to dissolve the compounds which would not be sufficiently soluble in water. Organic solvents which may be mentioned, for example, are C<sub>1</sub>-C<sub>4</sub> alkanols, such as ethanol and isopropanol.

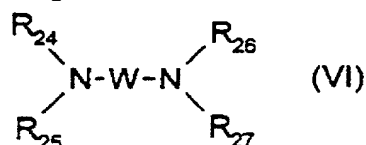
The solvents can be present in proportions preferably of between 1 and 40% by weight approximately

relative to the total weight of the dye composition, and even more preferably between 5 and 30% by weight approximately.

The pH of the dye composition in accordance with the invention is generally between 3 and 12 approximately, and preferably between 5 and 12 approximately. It can be adjusted to the desired value by means of acidifying or basifying agents usually used for dyeing keratin fibres.

Among the acidifying agents which may be mentioned, for example, are inorganic or organic acids such as hydrochloric acid, orthophosphoric acid, sulphuric acid, carboxylic acids such as acetic acid, tartaric acid, citric acid or lactic acid, and sulphonic acids.

Among the basifying agents which may be mentioned, for example, are aqueous ammonia, alkaline carbonates, alkanolamines such as mono-, di- and triethanolamine, 2-methyl-2-aminopropanol and derivatives thereof, sodium hydroxide, potassium hydroxide and the compounds of formula (VI) below:



in which W is a propylene residue optionally substituted with a hydroxyl group or a C<sub>1</sub>-C<sub>4</sub> alkyl radical; R<sub>24</sub>, R<sub>25</sub>, R<sub>26</sub> and R<sub>27</sub>, which may be identical or

different, represent a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> hydroxyalkyl radical.

The dye composition in accordance with the invention can also contain various adjuvants  
5 conventionally used in compositions for dyeing the hair.

Needless to say, a person skilled in the art will take care to select this or these optional additional compounds such that the advantageous  
10 properties intrinsically associated with the dye composition in accordance with the invention are not, or are not substantially, adversely affected by the addition or additions envisaged.

The dye composition in accordance with the  
15 invention can be in various forms, such as in the form of liquids, creams or gels, which are optionally pressurized, or in any other form which is suitable for dyeing keratin fibres, and in particular human hair.

A subject of the invention is also a process  
20 for dyeing keratin fibres, and in particular human keratin fibres such as the hair, using the dye composition as defined above.

According to this process, the dye composition as defined above is applied to the fibres,  
25 the colour being developed at acidic, neutral or alkaline pH with the aid of an oxidizing agent which is added to the dye composition only at the time of use, or which is present in an oxidizing composition that is

applied simultaneously or sequentially in a separate manner.

According to a particularly preferred embodiment of the dyeing process according to the invention, the dye composition described above is mixed, at the time of use, with an oxidizing composition containing, in a medium which is suitable for dyeing, at least one oxidizing agent present in an amount which is sufficient to develop a coloration. The mixture obtained is then applied to the keratin fibres and is left on them for 3 to 50 minutes approximately, preferably 5 to 30 minutes approximately, after which the fibres are rinsed, washed with shampoo, rinsed again and dried.

The oxidizing agent present in the oxidizing composition as defined above can be chosen from the oxidizing agents conventionally used for the oxidation dyeing of keratin fibres, and among which mention may be made of hydrogen peroxide, urea peroxide, alkali metal bromates, persalts such as perborates, percarbonates and persulphates, peracids, enzymes such as 2-electron oxidoreductases, peroxidases and lactases. Hydrogen peroxide is particularly preferred.

The pH of the oxidizing composition containing the oxidizing agent as defined above is such that, after mixing with the dye composition, the pH of the resulting composition applied to the keratin fibres preferably ranges between 3 and 12 approximately and

even more preferably between 5 and 11. It is adjusted to the desired value by means of acidifying or basifying agents usually used for dyeing keratin fibres and are as defined above.

5           The oxidizing composition as defined above can also contain various adjuvants conventionally used in compositions for dyeing the hair and as defined above.

10           The composition which is finally applied to the keratin fibres can be in various forms, such as in the form of liquids, creams or gels or in any other form which is suitable for dyeing keratin fibres, and in particular human hair.

15           Another subject of the invention is a multi-compartment dyeing device or multi-compartment dyeing "kit", or any other multi-compartment packaging system, a first compartment of which contains the dye composition as defined above and a second compartment of which contains the oxidizing composition as defined  
20 above. These devices may be equipped with a means for applying the desired mixture to the hair, such as the devices described in patent FR-2,586,913 in the name of the Applicant.

25           The examples which follow are intended to illustrate the invention without thereby limiting its scope.



## EXAMPLES

COMPARATIVE DYEING EXAMPLES 1 TO 4

The dye compositions below were prepared  
 5 (contents in grams):

EXAMPLE	1	2 (*)	3	4 (*)
4'-Dimethylaminobenzene-1'-azo-3-pyridine N-oxide (compound of formula (I))	0.5	0.5	-	-
2'-Acetylamino-4'-dimethylaminobenzene-1'-azo-1-ethyl-3-pyridinium ethosulphate (compound of formula (I))	-	-	0.6	0.6
para-Phenylenediamine (oxidation base)	0.324	0.324	0.324	0.324
5-Amino-2-methylphenol (coupler of formula (II))	0.369	-	0.369	-
meta-Aminophenol (coupler)	-	0.327	-	0.327
Common dye support	(**)	(**)	(**)	(**)
Demineralized water qs	100 g	100 g	100 g	100 g

(\*): Comparative example not forming part of the  
 invention

10

(\*\*): Common dye support:

-Oleyl alcohol polyglycerolated with 2 mol of glycerol	4.0	g
-Oleyl alcohol polyglycerolated with 4 mol of glycerol, containing 78% active material (A.M.)	5.69	g A.M.
-Oleic acid	3.0	g
-Oleylamine containing 2 mol of ethylene oxide, sold under the trade name Ethomeen O12® by the company Akzo	7.0	g
-Diethylaminopropyl laurylamino succinamate, sodium salt, containing 55% A.M.	3.0	g A.M.
-Oleyl alcohol	5.0	g
-Oleic acid diethanolamide	12.0	g
-Propylene glycol	3.5	g
-Ethyl alcohol	7.0	g
-Dipropylene glycol	0.5	g
-Propylene glycol monomethyl ether	9.0	g
-Sodium metabisulphite as an aqueous solution containing 35% A.M.	0.455	g A.M.
-Ammonium acetate	0.8	g
-Antioxidant, sequestering agent	qs	
-Fragrance, preserving agent	qs	
-Aqueous ammonia containing 20% $\text{NH}_3$	10.0	g

Each of the dye compositions described above  
was mixed, at the time of use, with an equivalent

weight-amount of 20-volumes hydrogen peroxide (6% by weight) having a pH of about 3.

Each resulting mixture had a pH of about  $10 \pm 0.2$  and was applied for 30 minutes to locks of  
5 permanent-waved grey hair containing 90% white hairs.

The hair was then rinsed with water, washed with a standard shampoo, rinsed again and then dried.

The colour of the locks was evaluated before and after dyeing, in the Munsell system, using a  
10 Minolta CM 2002<sup>®</sup> spectrophotometer.

According to the Munsell notation, a colour is defined by the formula:

$$HV / C$$

in which the three parameters denote, respectively, the  
15 "Hue" or shade (H), the "Value" or intensity (V) and the "Chroma" or saturation (C), the oblique line simply being a convention and not denoting a ratio.

The increase in the coloration  $\Delta E$  can be calculated by applying the Nickerson equation:

20

$$\Delta E = 0.4C_0dH + 6dV + 3dC$$

as described, for example, in "Journal of the Optical Society of America", vol. 34, No. 9, Sept 1944, pages  
25 550-570.

In this equation,  $\Delta E$  represents the difference in colour between two locks (in the present case the increase in the coloration),  $dH$ ,  $dV$  and  $dC$

represent the variation in absolute value of the three parameters H, V and C,  $C_0$  representing the saturation of the lock relative to which it is desired to evaluate the difference in colour.

- 5           The greater the value of  $\Delta E$ , the greater the difference in colour between the two locks, and, in the present case, the greater the increase in the coloration (or intensity of the coloration).

The results are given in the table below:

10

Example	Colour of the lock before dyeing	Colour of the lock after dyeing	Increase in coloration			
			dH	dV	dC	$\Delta E$
1	3.3 Y 5.8/1.6	6.5 R 2.7/3.8	16.8	3.1	2.2	36.0
2 (*)	3.3 Y 5.8/1.6	1.2 YR 2.4/2.1	12.1	3.4	0.5	29.6
3	3.3 Y 5.8/1.6	5.1 R 2.5/3.0	18.2	3.3	1.4	35.6
4 (*)	3.3 Y 5.8/1.6	8.7 R 2.2/1.5	14.6	3.6	0.1	31.2

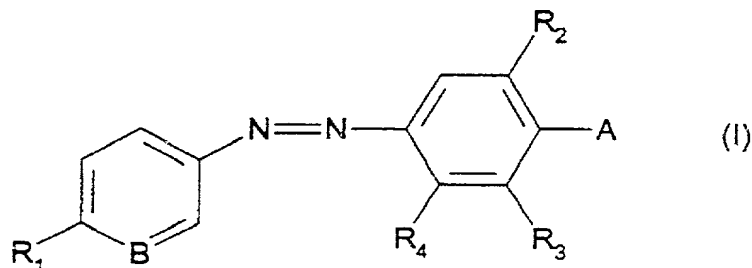
(\*) Comparative example not forming part of the invention

- 15           It is found that the dye compositions of Examples 1 and 3 in accordance with the invention, i.e. compositions containing a combination of a direct dye of formula (I), an oxidation base and a coupler of formula (II), lead to more intense colorations than the
- 20 dye compositions of Examples 2 and 4 not forming part

of the invention since they contain an unsubstituted coupler of meta-aminophenol type and as described, for example, in patent application FR-A-2,285,851.

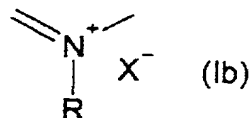
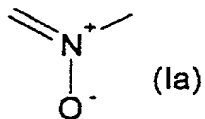
CLAIMS

1. Composition for the oxidation dyeing of keratin fibres, and in particular of human keratin fibres such as the hair, characterized in that it comprises, in a medium which is suitable for dyeing:
- at least one oxidation base,
  - as direct dye, at least one 3-aminopyridine derivative chosen from the compounds of formula (I) below:



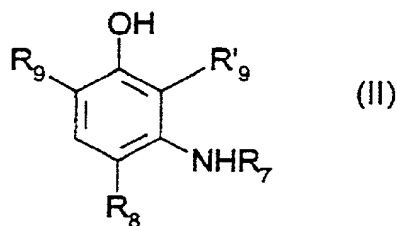
in which:

- B represents a group of formula (Ia) or (Ib) below:



- R represents a C<sub>1</sub>-C<sub>4</sub> alkyl radical;
- R<sub>1</sub> represents a hydrogen or halogen atom such as chlorine, bromine or fluorine, or a C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> alkoxy radical;
- R<sub>2</sub> represents a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> alkoxy radical;

- $R_4$  represents a hydrogen or halogen atom such as chlorine, bromine or fluorine, or a  $C_1$ - $C_4$  alkyl, nitro, amino or  $(C_1$ - $C_4)$ acylamino radical;
- $R_3$  represents a hydrogen atom or else  $R_4$  and  $R_3$  together form a 6-membered unsaturated ring bearing a hydroxyl substituent chelated with one of the nitrogen atoms of the azo double bond;
- A represents a residue  $-NR_5R_6$  in which  $R_5$  represents a hydrogen atom or a  $C_1$ - $C_4$  alkyl,  $C_1$ - $C_4$  monohydroxyalkyl or  $C_2$ - $C_4$  polyhydroxyalkyl radical;  $R_6$  represents a hydrogen atom, a  $C_1$ - $C_4$  alkyl,  $C_1$ - $C_4$  monohydroxyalkyl or  $C_2$ - $C_4$  polyhydroxyalkyl radical, a phenyl ring or a  $-CH_2-SO_3Na$  radical;
- $X^-$  represents a monovalent or divalent anion and is preferably chosen from a halogen atom such as chlorine, bromine, fluorine or iodine, a hydroxide, a hydrogen sulphate or a  $(C_1$ - $C_6)$ alkyl sulphate such as, for example, a methyl sulphate or an ethyl sulphate, and
- at least one coupler chosen from the meta-aminophenol derivatives of formula (II) below, and the addition salts thereof with an acid:



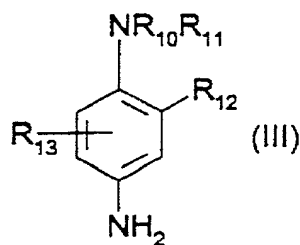
in which:

- R<sub>7</sub> represents a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl, C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl or C<sub>1</sub>-C<sub>4</sub> monoaminoalkyl radical;
- R<sub>8</sub> represents a hydrogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> alkoxy radical or a halogen atom chosen from chlorine, bromine and fluorine,
- R<sub>9</sub> and R'<sub>9</sub>, which may be identical or different, represent a hydrogen or halogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl, C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkoxy or C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkoxy radical;

it being understood that at least one of the radicals R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub> and R'<sub>9</sub> is other than a hydrogen atom.

2. Composition according to Claim 1,
- characterized in that the oxidation base(s) is (are) chosen from para-phenylenediamines, double bases, para-aminophenols, ortho-aminophenols and heterocyclic oxidation bases.

3. Composition according to Claim 2,
- characterized in that the para-phenylenediamines are chosen from the compounds of formula (III) below, and the addition salts thereof with an acid:



in which:

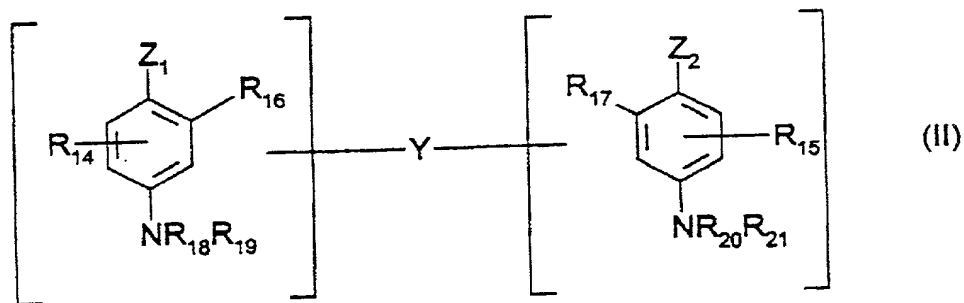


- R<sub>10</sub> represents a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl radical, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical, C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl radical, (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl radical, C<sub>1</sub>-C<sub>4</sub> alkyl radical substituted with a  
 5 nitrogenous group, phenyl or 4'-aminophenyl;
- R<sub>11</sub> represents a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl radical, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical, C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl radical, (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl radical or C<sub>1</sub>-C<sub>4</sub> alkyl radical substituted with a  
 10 nitrogenous group;
- R<sub>12</sub> represents a hydrogen atom, a halogen atom such as a chlorine, bromine, iodine or fluorine atom, or a C<sub>1</sub>-C<sub>4</sub> alkyl radical, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical, C<sub>1</sub>-C<sub>4</sub> hydroxyalkoxy radical, acetylamino(C<sub>1</sub>-C<sub>4</sub>)alkoxy,  
 15 mesylamino(C<sub>1</sub>-C<sub>4</sub>)alkoxy or carbamoylamino(C<sub>1</sub>-C<sub>4</sub>)alkoxy radical,
- R<sub>13</sub> represents a hydrogen or halogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl radical.

4. Composition according to Claim 3,  
 20 characterized in that the para-phenylenediamines of formula (III) are chosen from para-phenylenediamine, para-tolylenediamine, 2-chloro-para-phenylenediamine, 2,3-dimethyl-para-phenylenediamine, 2,6-dimethyl-para-phenylenediamine, 2,6-diethyl-para-phenylenediamine,  
 25 2,5-dimethyl-para-phenylenediamine, N,N-dimethyl-para-phenylenediamine, N,N-diethyl-para-phenylenediamine, N,N-dipropyl-para-phenylenediamine, 4-amino-N,N-diethyl-3-methylaniline, N,N-bis( $\beta$ -hydroxyethyl)-para-

phenylenediamine, 4-N,N-bis( $\beta$ -hydroxyethyl)amino-2-methylaniline, 4-N,N-bis( $\beta$ -hydroxyethyl)amino-2-chloroaniline, 2- $\beta$ -hydroxyethyl-para-phenylenediamine, 2-fluoro-para-phenylenediamine, 2-isopropyl-para-phenylenediamine, N-( $\beta$ -hydroxypropyl)-para-phenylenediamine, 2-hydroxymethyl-para-phenylenediamine, N,N-dimethyl-3-methyl-para-phenylenediamine, N-ethyl-N-( $\beta$ -hydroxyethyl)-para-phenylenediamine, N-( $\beta,\gamma$ -dihydroxypropyl)-para-phenylenediamine, N-(4'-aminophenyl)-para-phenylenediamine, N-phenyl-para-phenylenediamine, 2- $\beta$ -hydroxyethyloxy-para-phenylenediamine, 2- $\beta$ -acetylaminioethyloxy-para-phenylenediamine and N-( $\beta$ -methoxyethyl)-para-phenylenediamine, and the addition salts thereof with an acid.

5. Composition according to Claim 2, characterized in that the double bases are chosen from the compounds of formula (IV) below, and the addition salts thereof with an acid:



in which:

- $\text{Z}_1$  and  $\text{Z}_2$ , which may be identical or different, represent a hydroxyl or  $-\text{NH}_2$  radical which can be

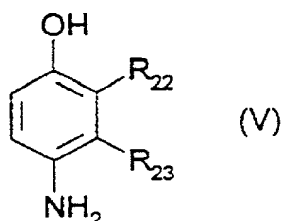
substituted with a C<sub>1</sub>-C<sub>4</sub> alkyl radical or with a linker arm Y;

- the linker arm Y represents a linear or branched alkylene chain comprising from 1 to 14 carbon atoms, which can be interrupted or terminated with one or more nitrogenous groups and/or with one or more hetero atoms such as oxygen, sulphur or nitrogen atoms, and optionally substituted with one or more hydroxyl or C<sub>1</sub>-C<sub>6</sub> alkoxy radicals;
  - R<sub>14</sub> and R<sub>15</sub> represent a hydrogen or halogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl radical, C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl radical or C<sub>1</sub>-C<sub>4</sub> aminoalkyl radical or a linker arm Y;
  - R<sub>16</sub>, R<sub>17</sub>, R<sub>18</sub>, R<sub>19</sub>, R<sub>20</sub> and R<sub>21</sub>, which may be identical or different, represent a hydrogen atom, a linker arm Y or a C<sub>1</sub>-C<sub>4</sub> alkyl radical;
- it being understood that the compounds of formula (IV) comprise only one linker arm Y per molecule.

6. Composition according to Claim 5,
- characterized in that the double bases of formula (IV) are chosen from N,N'-bis(β-hydroxyethyl)-N,N'-bis(4'-aminophenyl)-1,3-diaminopropanol, N,N'-bis(β-hydroxyethyl)-N,N'-bis(4'-aminophenyl)ethylenediamine, N,N'-bis(4-aminophenyl)tetramethylenediamine, N,N'-bis(β-hydroxyethyl)-N,N'-bis(4-aminophenyl)tetramethylenediamine, N,N'-bis(4-methylaminophenyl)tetramethylenediamine, N,N'-bis(ethyl)-N,N'-bis(4'-amino-3'-

methylphenyl)ethylenediamine and 1,8-bis(2,5-diaminophenoxy)-3,5-dioxaoctane, and the addition salts thereof with an acid.

7. Composition according to Claim 2,  
 5 characterized in that para-aminophenols are chosen from the compounds of formula (V) below, and the addition salts thereof with an acid:



in which:

- 10 - R<sub>22</sub> represents a hydrogen or halogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl, (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl, C<sub>1</sub>-C<sub>4</sub> aminoalkyl or hydroxy(C<sub>1</sub>-C<sub>4</sub>)alkylamino(C<sub>1</sub>-C<sub>4</sub>)alkyl radical,  
 - R<sub>23</sub> represents a hydrogen or halogen atom or a C<sub>1</sub>-C<sub>4</sub>  
 15 alkyl, C<sub>1</sub>-C<sub>4</sub> monohydroxyalkyl, C<sub>2</sub>-C<sub>4</sub> polyhydroxyalkyl, C<sub>1</sub>-C<sub>4</sub> aminoalkyl, cyano(C<sub>1</sub>-C<sub>4</sub>)alkyl or (C<sub>1</sub>-C<sub>4</sub>)alkoxy(C<sub>1</sub>-C<sub>4</sub>)alkyl radical,

it being understood that at least one of the radicals R<sub>22</sub> and R<sub>23</sub> represents a hydrogen atom.

- 20 8. Composition according to Claim 7, characterized in that the para-aminophenols of formula (V) are chosen from para-aminophenol, 4-amino-3-methylphenol, 4-amino-3-fluorophenol, 4-amino-3-hydroxymethylphenol, 4-amino-2-methylphenol, 4-amino-2-hydroxymethylphenol, 4-amino-2-methoxymethylphenol,  
 25

4-amino-2-aminomethylphenol, 4-amino-2-( $\beta$ -hydroxyethylaminomethyl)phenol and 4-amino-2-fluorophenol, and the addition salts thereof with an acid.

5                    9.    Composition according to Claim 2, characterized in that the ortho-aminophenols are chosen from 2-aminophenol, 2-amino-5-methylphenol, 2-amino-6-methylphenol and 5-acetamido-2-aminophenol, and the addition salts thereof with an acid.

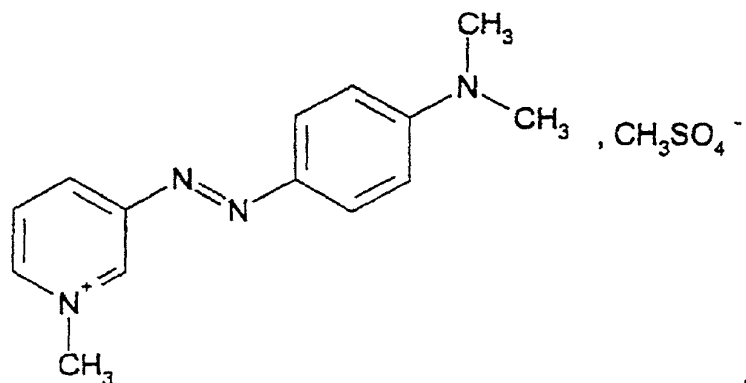
10                   10.   Composition according to Claim 2, characterized in that the heterocyclic oxidation bases are chosen from pyridine derivatives, pyrimidine derivatives and pyrazole derivatives, and the addition salts thereof with an acid.

15                   11.   Composition according to any one of the preceding claims, characterized in that the oxidation base(s) represent(s) from 0.0005 to 12% by weight relative to the total weight of the dye composition.

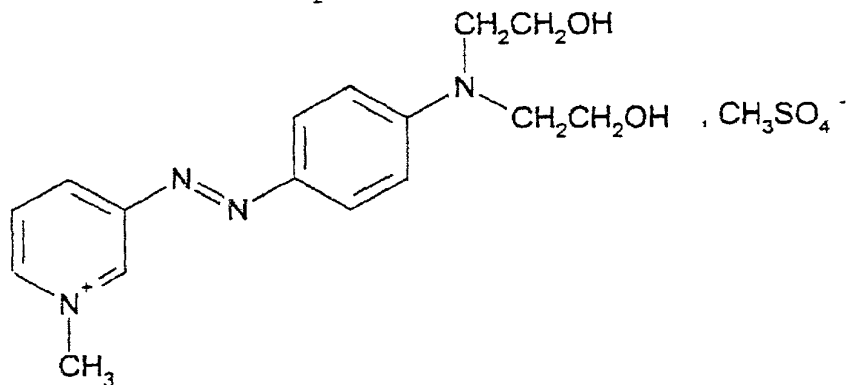
20                   12.   Composition according to Claim 11, characterized in that the oxidation base(s) represent(s) from 0.005 to 6% by weight relative to the total weight of the dye composition.

25                   13.   Composition according to any one of the preceding claims, characterized in that the 3-aminopyridine derivative(s) of formula (I) is (are) chosen from:

- 4'-dimethylaminobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:

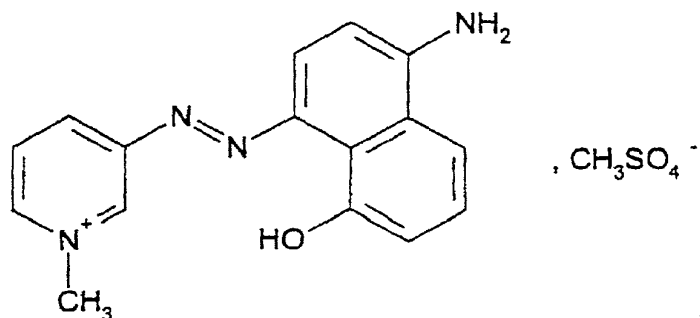


- 4'-bis(β-hydroxyethyl)aminobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:

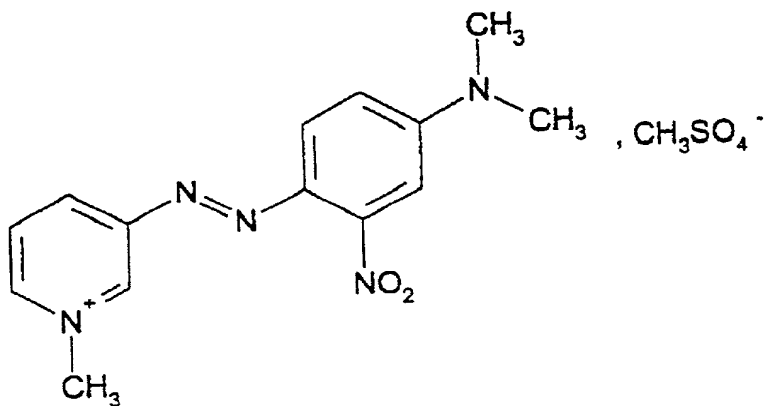


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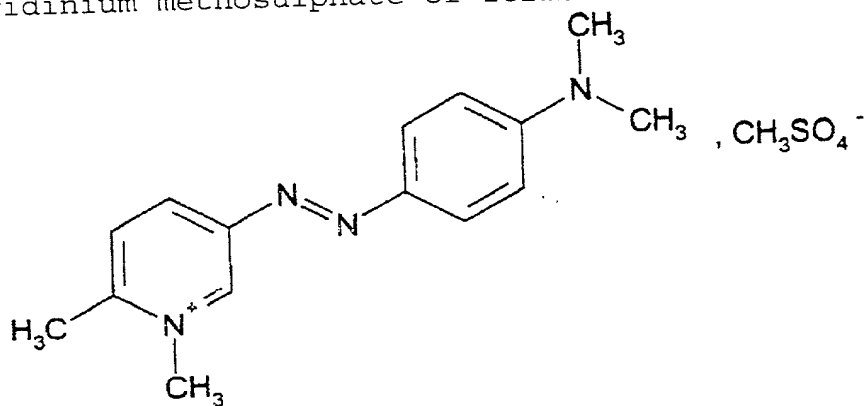
- 4'-amino-8'-hydroxynaphthalene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



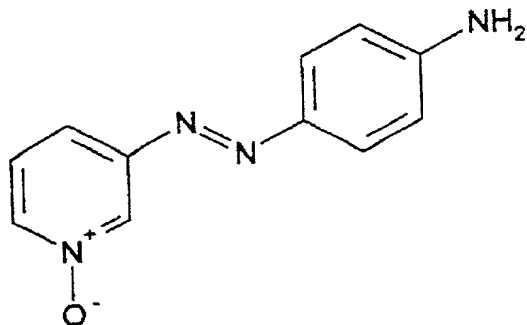
- 4'-dimethylamino-2'-nitrobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:
- 10



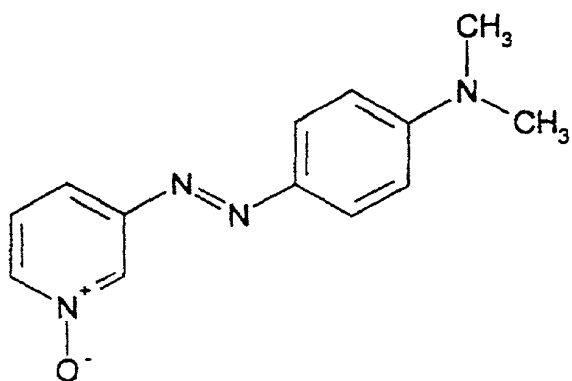
- 4'-dimethylaminobenzene-1'-azo-1,6-dimethyl-3-pyridinium methosulphate of formula:



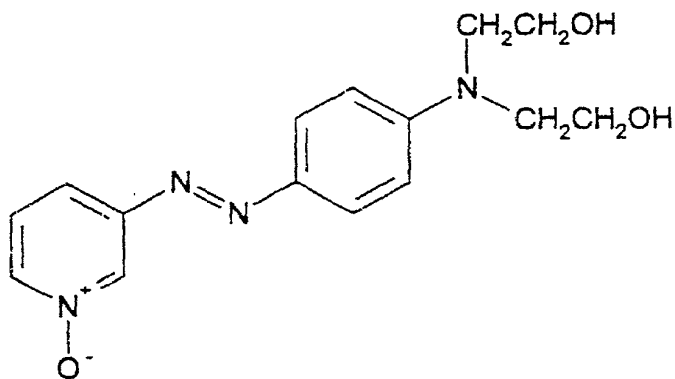
- 5 - 4'-aminobenzene-1'-azo-3-pyridine N-oxide of formula:



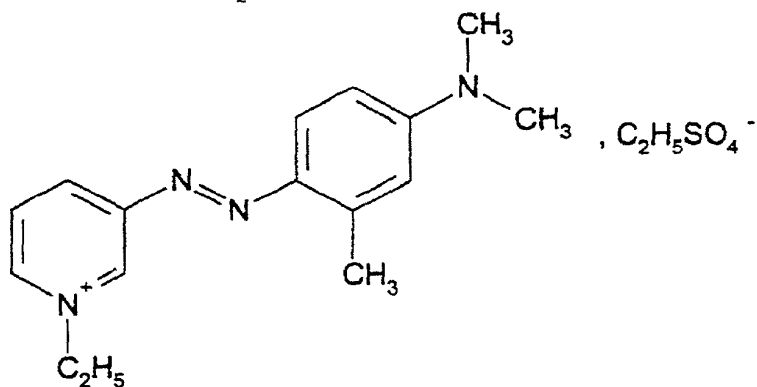
- 4'-dimethylaminobenzene-1'-azo-3-pyridine N-oxide of formula:



- 4'-N,N-bis(β-hydroxyethyl)aminobenzene-1'-azo-3-pyridine N-oxide of formula:

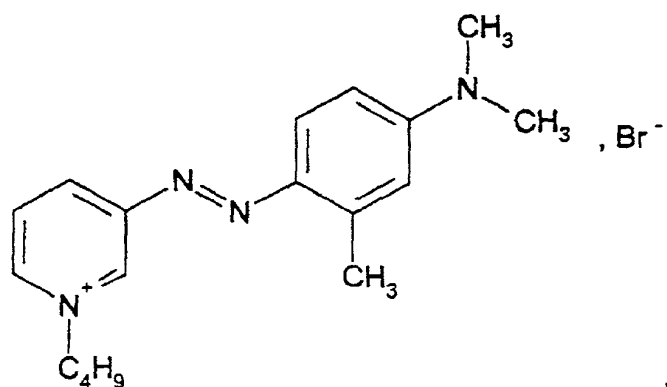


- 5 - 4'-dimethylamino-2'-methylbenzene-1'-azo-1-ethyl-3-pyridinium ethosulphate of formula:

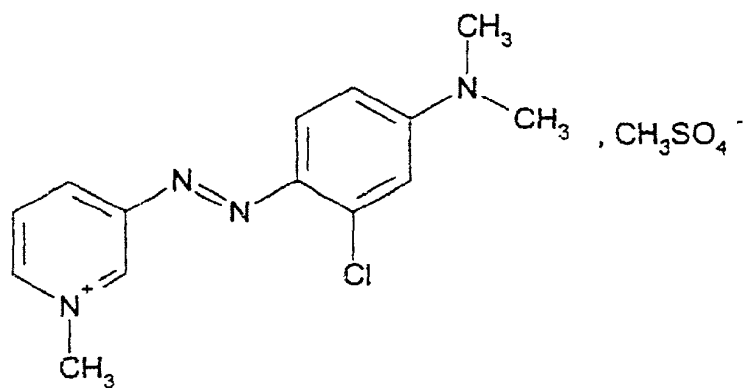


- 4'-dimethylamino-2'-methylbenzene-1'-azo-1-butyl-3-pyridinium bromide of formula:

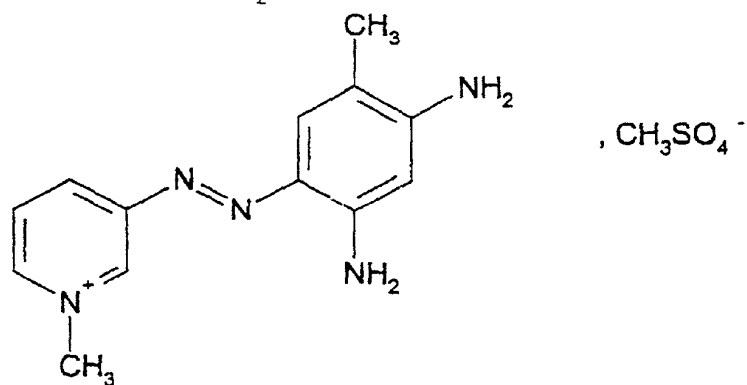




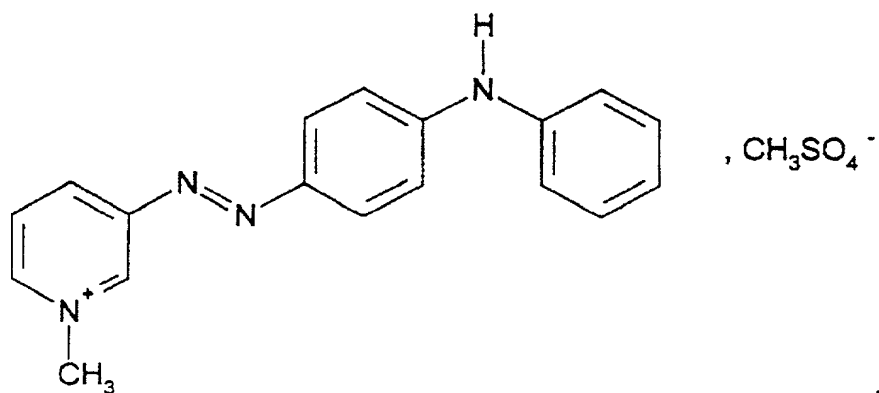
- 4'-dimethylamino-2'-chlorobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



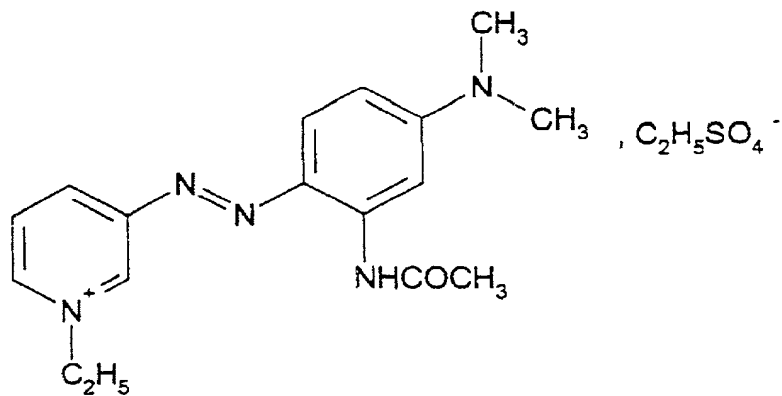
5 - 2',4'-diamino-5'-methylbenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



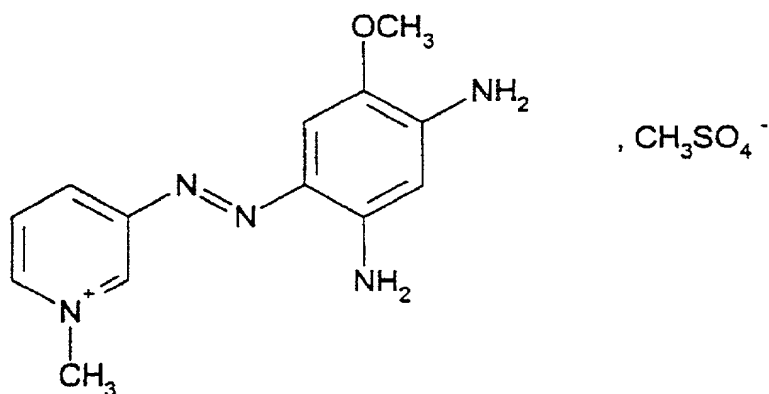
- 4'-phenylaminobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



- 2'-acetylamino-4'-dimethylaminobenzene-1'-azo-1-ethyl-3-pyridinium ethosulphate of formula:

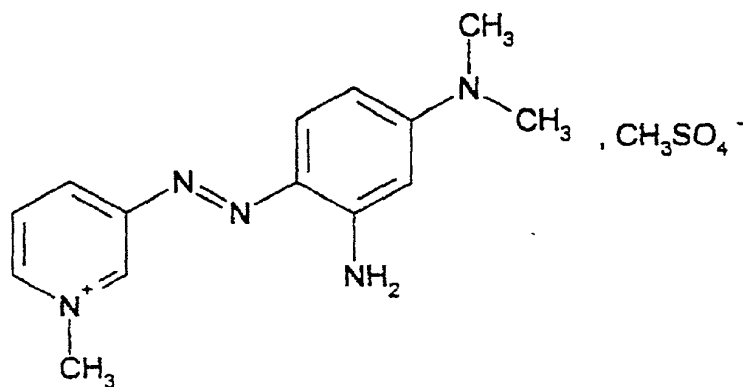


- 5 - 2',4'-diamino-5'-methoxybenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:



and

- 2'-amino-4'-dimethylaminobenzene-1'-azo-1-methyl-3-pyridinium methosulphate of formula:
- 10



14. Composition according to any one of the preceding claims, characterized in that the 3-amino-pyridine derivative(s) of formula (I) represent(s) from  
 5 0.001 to 10% by weight relative to the total weight of the dye composition.

15. Composition according to Claim 14, characterized in that the 3-aminopyridine derivative(s) of formula (I) represent(s) from 0.01 to 5% by weight  
 10 relative to the total weight of the dye composition.

16. Composition according to any one of the preceding claims, characterized in that the meta-aminophenol derivatives of formula (II) are chosen from  
 5-amino-2-methoxyphenol, 5-amino-2-( $\beta$ -  
 15 hydroxyethyloxy)phenol, 5-amino-2-methylphenol, 5-N-( $\beta$ -hydroxyethyl)amino-2-methylphenol, 5-N-( $\beta$ -hydroxyethyl)amino-4-methoxy-2-methylphenol, 5-amino-4-methoxy-2-methylphenol, 5-amino-4-chloro-2-methylphenol, 5-amino-2,4-dimethoxyphenol, 5-( $\gamma$ -  
 20 hydroxypropylamino)-2-methylphenol, 3-amino-2-chloro-6-methylphenol, 3-amino-6-chlorophenol and 3-( $\beta$ -

aminoethyl)amino-6-chlorophenol, and the addition salts thereof with an acid.

17. Composition according to any one of the preceding claims, characterized in that the meta-  
5 aminophenol derivative(s) of formula (II) represent(s) from 0.0001 to 10% by weight relative to the total weight of the dye composition.

18. Composition according to Claim 17,  
characterized in that the meta-aminophenol derivative(s)  
10 of formula (II) represent(s) from 0.005 to 5% by weight relative to the total weight of the dye composition.

19. Composition according to any one of the preceding claims, characterized in that it contains one or more couplers other than the meta-aminophenol  
15 derivatives of formula (II) as defined in Claim 1 and/or one or more direct dyes other than the 3-aminopyridine derivatives of formula (I) as defined in Claim 1.

20. Composition according to any one of the  
20 preceding claims, characterized in that the addition salts with an acid are chosen from the hydrochlorides, hydrobromides, sulphates, tartrates, lactates and acetates.

21. Composition according to any one of the  
25 preceding claims, characterized in that the medium which is suitable for dyeing consists of water or of a mixture of water and at least one organic solvent.

22. Composition according to any one of the preceding claims, characterized in that it has a pH of between 3 and 12.

23. Process for dyeing keratin fibres, and  
5 in particular human keratin fibres such as the hair, characterized in that at least one dye composition as defined in any one of Claims 1 to 22 is applied to the said fibres, the colour being developed at acidic,  
neutral or alkaline pH with the aid of an oxidizing  
10 agent which is added to the dye composition only at the time of use, or which is present in an oxidizing composition that is applied simultaneously or sequentially.

24. Process according to Claim 23,  
15 characterized in that the oxidizing agent present in the oxidizing composition is chosen from hydrogen peroxide, urea peroxide, alkali metal bromates, persalts such as perborates, percarbonates and persulphates, peracids and enzymes.

20 25. Multi-compartment dyeing device or multi-compartment dyeing "kit", a first compartment of which contains a dye composition as defined in any one of Claims 1 to 22 and a second compartment of which contains an oxidizing composition.

ABSTRACT

COMPOSITION FOR THE OXIDATION DYEING OF KERATIN FIBRES  
AND DYEING PROCESS USING THIS COMPOSITION

The invention relates to a composition for the oxidation dyeing of keratin fibres, and in particular human keratin fibres such as the hair, comprising, in a medium which is suitable for dyeing, at least one oxidation base, at least one 3-aminopyridine derivative as direct dye, and at least one substituted meta-aminophenol as coupler, as well as to the dyeing process using this composition.

# Declaration and Power of Attorney for Patent Application

## Déclaration et Pouvoir pour Demand de Brevet

### French Language Declaration

En tant que l'inventeur nommé ci-après, je déclare par le présent acte que:

Mon domicile, mon adresse postale et ma nationalité sont ceux figurant ci-dessous à côté de mon nom.

Je crois être le premier inventeur original et unique (si un seul nom est mentionné ci-dessous), ou l'un des premiers co-inventeurs originaux (si plusieurs noms sont mentionnés ci-dessous) de l'objet revendiqué, pour lequel une demande de brevet a été déposée concernant l'invention intitulée

et dont la description est fournie ci-joint à moins que la case suivante n'ait été cochée:

☒ a été déposée le \_\_\_\_\_  
sous le numéro de demande des Etats-Unis ou le  
numéro de demande international PCT  
\_\_\_\_\_ et modifiée  
\_\_\_\_\_ (les cas échéant).

Je déclare par le présent acte avoir passé en revue et compris le contenu de la description ci-dessus, revendications comprises, telles que modifiées par toute modification dont il aura été fait référence ci-dessus.

Je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

OXIDATION DYEING COMPOSITION FOR  
KERATINOUS FIBRES CONTAINING A 3-  
AMINOPYRIDINE AZO DERIVATIVE AND DYEING  
METHOD USING SAID COMPOSITION

the specification of which is attached hereto unless the following box is checked:

☒ was filed on March 11, 1999 as United States  
Application Number or PCT International  
Application Number PCT/FR99/00542 and was  
amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

### French Language Declaration

Je revendique par le présent acte avoir la priorité étrangère, en vertu du Titre 35, § 119(a)-(d) ou § 365(b) du Code des Etats-Unis, sur toute demande étrangère de brevet ou certificat d'inventeur ou, en vertu du Titre 35, § 365(a) du même Code, sur toute demande internationale PCT désignant au moins un pays autre que les Etats-Unis et figurant ci-dessous et, en cochant la case, j'ai aussi indiqué ci-dessous toute demande étrangère de brevet, tout certificat d'inventeur ou toute demande internationale PCT ayant une date de dépôt précédant celle de la demande à propos de laquelle une priorité est revendiquée.

Prior foreign application(s)  
Demande(s) de brevet antérieure(s)

98/03453                      France  
(Number)                      (Country)  
(Numéro)                      (Pays)

\_\_\_\_\_  
(Number)                      (Country)  
(Numéro)                      (Pays)

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 119(e) du Code des Etats-Unis, de toute demande de brevet provisoire effectuée aux Etats-Unis et figurant ci-dessous.

\_\_\_\_\_  
(Application No.)                      (Filing Date)  
(N° de demande)                      (Date de dépôt)

\_\_\_\_\_  
(Application No.)                      (Filing Date)  
(N° de demande)                      (Date de dépôt)

Je revendique par le présent acte tout bénéfice, en vertu du Titre 35, § 120 du Code des Etats-Unis, de toute demande de brevet effectuée aux Etats-Unis, ou en vertu du Titre 35, § 365(c) du même Code, de toute demande internationale PCT désignant les Etats-Unis et figurant ci-dessous et, dans la mesure où l'objet de chacune des revendications de cette demande de brevet n'est pas divulgué dans la demande antérieure américaine ou internationale PCT, en vertu des dispositions du premier paragraphe du Titre 35, § 112 du Code des Etats-Unis, je reconnais devoir divulguer toute information pertinente à la brevetabilité, comme défini dans le Titre 37, § 1.56 du Code fédéral des réglementations, dont laquelle est devenue disponible entre la date de dépôt de la demande antérieure, et la date de dépôt de la demande nationale ou internationale PCT de la présente demande:

\_\_\_\_\_  
(Application No.)                      (Filing Date)  
(N° de demande)                      (Date de dépôt)

\_\_\_\_\_  
(Application No.)                      (Filing Date)  
(N° de demande)                      (Date de dépôt)

Je déclare par le présent acte que toute déclaration ci-incluse est, à ma connaissance, véridique et que toute déclaration formulée à partir de renseignements ou de suppositions est tenue pour véridique; et de plus, que toutes ces déclarations ont été formulées en sachant que toute fausse déclaration volontaire ou son équivalent est passible d'une amende ou d'une incarcération, ou des deux, en vertu de la Section 1001 du Titre 18 du Code des Etats-Unis, et que de telles déclarations volontairement fausses risquent de compromettre la validité de la demande de brevet ou du brevet délivré à partir de celle-ci.

I hereby claim foreign priority under Title 35, United States Code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International Application which designated at least one country other than the United States, listed below, and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Priority Not Claimed  
Droit de priorité non revendiqué

20 March 1998                      ☐  
(Day/Month/Year Filed)  
(Jour/Mois/Anné de dépôt)

\_\_\_\_\_  
(Day/Month/Year Filed)                      ☐  
(Jour/Mois/Anné de dépôt)

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International Application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International Application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose any or all information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

\_\_\_\_\_  
(Status) (patented, pending, abandoned)  
(Status) (breveté, en cours d'examen, abandonné)

\_\_\_\_\_  
(Status) (patented, pending, abandoned)  
(Status) (breveté, en cours d'examen, abandonné)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.



**French Language Declaration**

POUVOIRS: En tant que l'inventeur cité, je désigne par la présente l'(les) avocat(s) et/ou agent(s) suivant(s) pour qu'ils poursuive(nt) la procédure de cette demande de brevet et traite(nt) toute affaire s'y rapportant avec L'Office des brevets et des marques: *(mentionner le nom et le numéro d'enregistrement).*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this patent application and transact all business in the Patent and Trademark Office connected therewith: *(list name and registration number):*

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Signature du second inventeur	Date	Second Inventor's signature Jean COTTERET	Date 1999, November 10 <sup>th</sup>
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